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Rev. 07/10/02

180055

LETTER REPORT
FOR THE REMEDIAL PORTION OF
WESTERN MINERAL PROCESSING
MINNEAPOLIS, HENNEPIN COUNTY, MINNESOTA
TDD: S05-0006-010
PAN: 05GN1001RSXX

September 11, 2000

Prepared for:

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Emergency Response Branch
77 West Jackson Boulevard
Chicago, Illinois 60604

Prepared by: _____ Date: 9/11/00
for Vincent L. Gee, START Project Manager

Reviewed by: _____ Date: 9/11/00
Patrick Zwilling, START Assistant Program Manager

Approved by: _____ Date: 9/11/00
for Daniel Sewall, START Program Manager

ecology and environment, inc.
International Specialists in the Environment

33 North Dearborn Street, Chicago, Illinois 60602
Tel. 312/578-9243, Fax: 312/578-9345

ecology and environment, inc.
International Specialists in the Environment

33 North Dearborn Street
Chicago, Illinois 60602
Tel. 312/578-9243, Fax: 312/578-9345

September 11, 2000

Ms. Gail Nabasny, START Project Officer
United States Environmental Protection Agency
Emergency Response Branch
77 W. Jackson Boulevard, 5th Floor
Chicago, IL 60604-3690

Re: Western Mineral Processing
Minneapolis, Hennepen County, Minnesota
TDD: S05-0006-010
PAN: 050N1001RSXX

Dear Ms. Nabasny:

The United States Environmental Protection Agency (U.S. EPA) tasked the Ecology and Environment, Inc. (E & E), Superfund Technical Assessment and Response Team (START), under Technical Direction Document (TDD) S05-0006-010, to conduct an outdoor residential assessment and perform amphibole asbestos sampling activities for the neighborhood surrounding the former Western Mineral Products (WMP) and Electramatic, Inc.(Electramatic) site (Attachment A, Figure 1). This letter report documents activities related to the outdoor residential assessment. The industrial sites are located at 1720 Madison Street and 1815 Jefferson Street N.E., Minneapolis, Hennepin County, Minnesota, with latitude and longitude coordinates of 45.00336N, 93.25561W respectively. The site is bordered on the east by Burlington Northern & Santa Fe railroad tracks, on the north by commercial buildings, on the west by commercial and residential buildings and a city maintenance facility, and on the south by a commercial complex. The residential assessment and amphibole asbestos sampling activities expanded out 0.4 miles in all directions (Attachment A, Figure 2). Photodocumentation collected during U.S. EPA-related residential assessment activities for the WMP site are presented in Attachment B.

The facility was operated by Western Mineral Products, which was purchased by W.R. Grace Co., as an exfoliating plant for vermiculite ore from Libby, Montana. W.R. Grace operated the facility until approximately 1989. During the operating period between the 1950s and 1989, WMP/W.R. Grace placed piles of residual vermiculite outside the facility and the neighborhood residents were allowed to take the waste material free of charge. This residual vermiculite contained amphibole asbestos and can be identified visually as vermiculite mixed with small gray rock fragments with a bluish-green tint. At that time, the site was sold to Madison Complex and was leased to Panel Specialties Inc.(PSI), which currently manufactures prison furniture on site. Allegedly, in 1990, W.R. Grace conducted a removal of all material stored in the two on-site silos. U.S. EPA site assessment activities were conducted to determine the potential threat of amphibole asbestos-containing material (ACM) in vermiculite produced at the W.R.Grace facility that remains in soil on site.

NON RESPONSIVE

[redacted]

NON RESPONSIVE

[redacted]

The preparation of this Letter Report serves as the final deliverable, as per OSC Len Zintak's request. All tasks pertaining to this TDD have been completed. Please contact our office should you have any question or require additional information.

Sincerely,

for Vincent L. Gee
START Project Manager

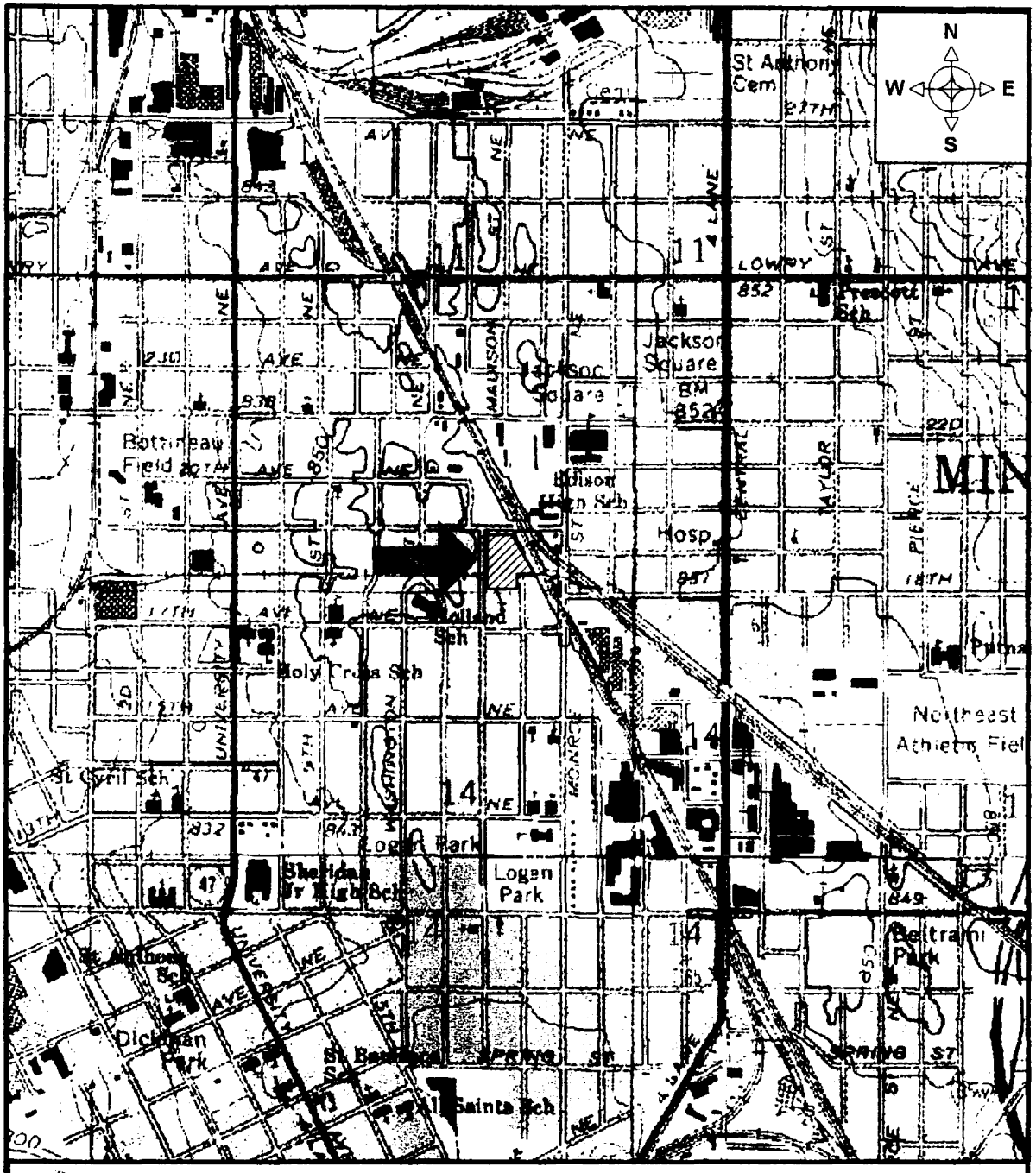
Daniel Sewall
START Program Manager

Attachments: A - Figures
B - Photodocumentation
C - Tables
D - Analytical Results

cc: Len Zintak, U.S. EPA OSC
Sonia Vega, U.S. EPA OSC
START TDD File

Attachment A

Figures



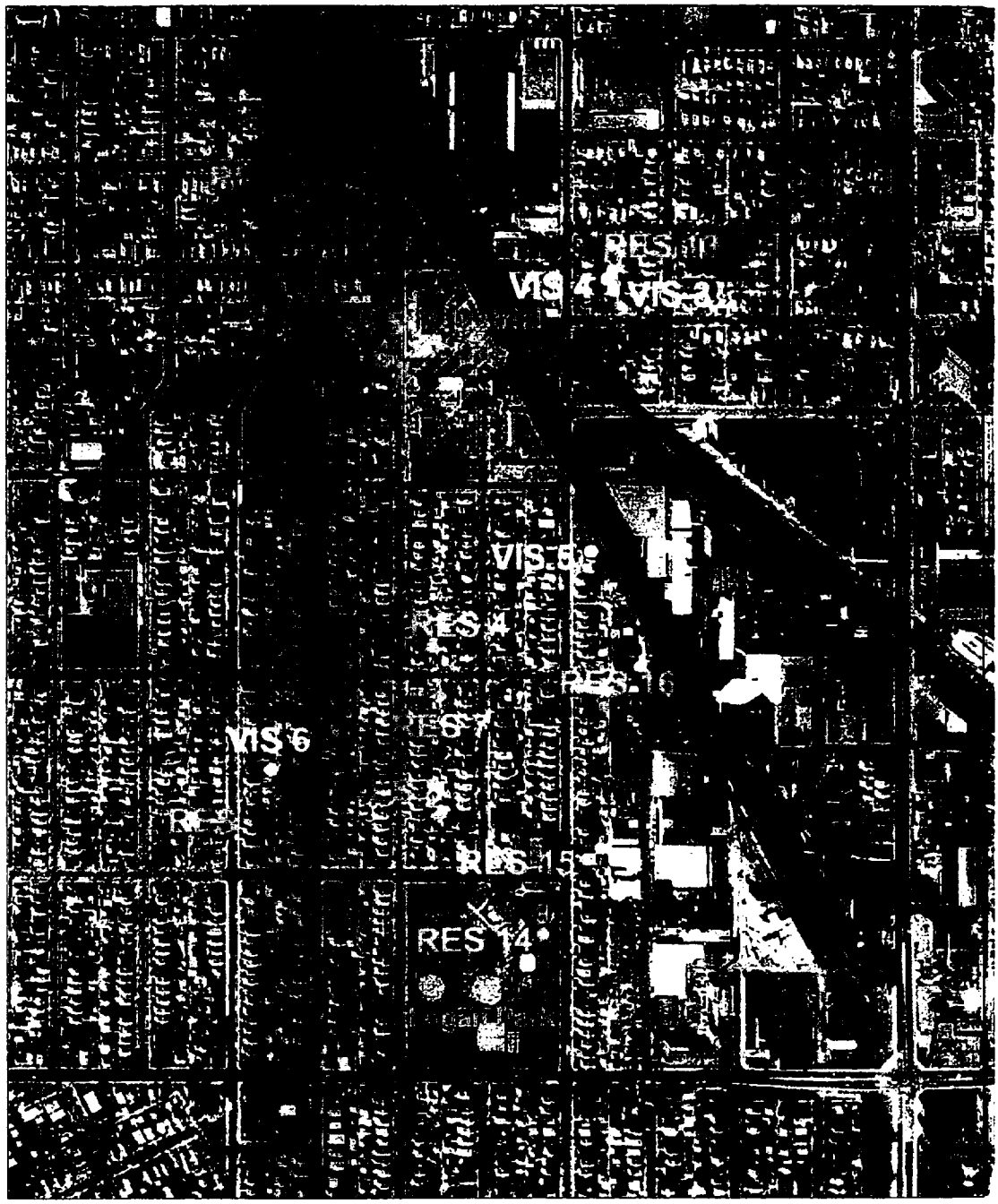
ecology and environment, inc.

Region 5 - Superfund Technical Assessment and Response Team

33 North Dearborn, Suite 900, Chicago, Illinois 60602

Title:	Figure:
Site Location Map	1
Site:	Scale:
Western Mineral Processing	Not to Scale
City: State:	Date:
Minneapolis Minnesota	7/13/00

Western Mineral Site
Vicinity of 1720 Madison Street NE
Minneapolis, Minnesota



Legend

- Grab Samples August 1-2, 2000
- Grab Samples June 20-22, 2000
- Visually Inspected August 1-2, 2000
- Industrial Site

N

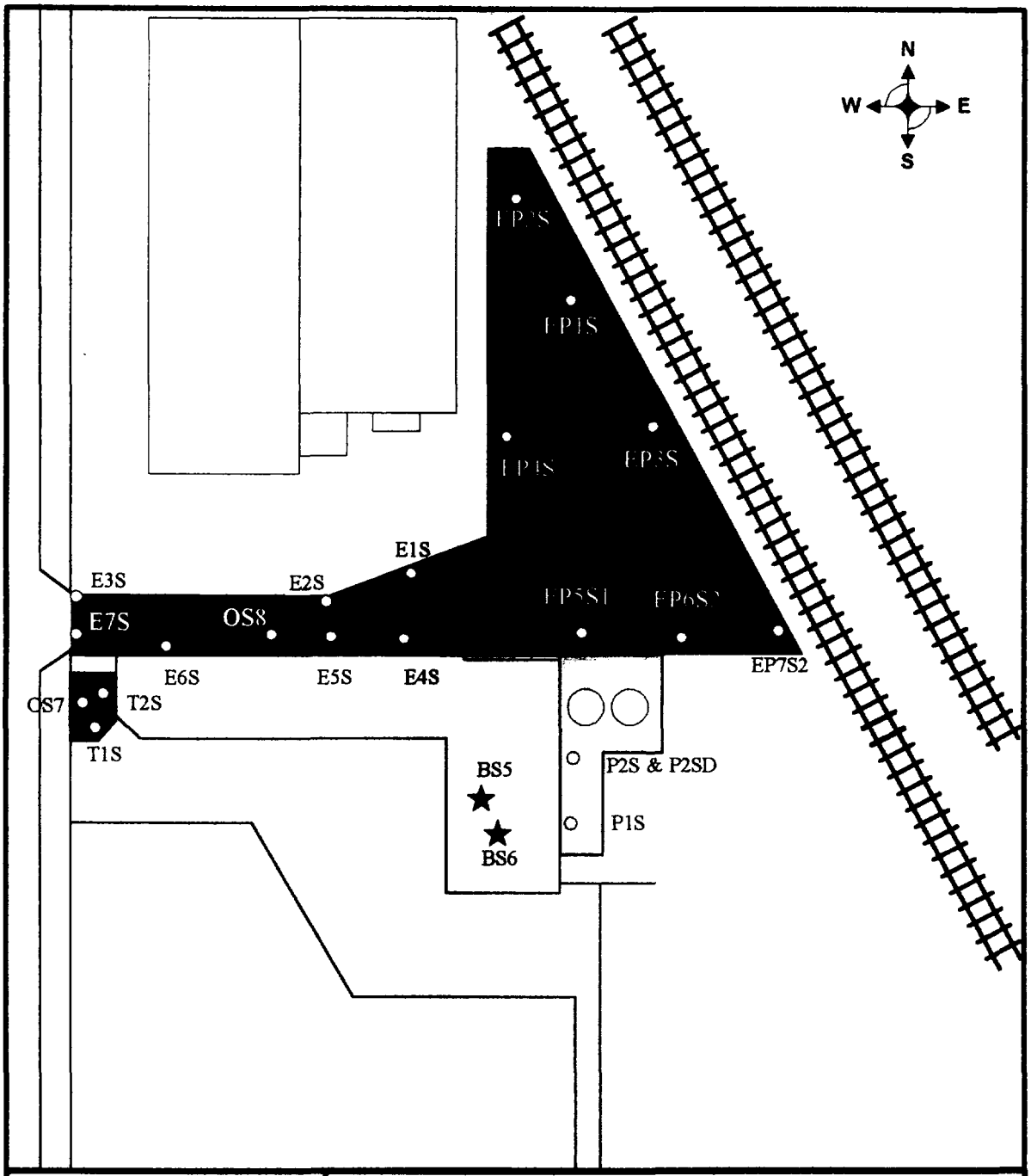
Attachment A, Figure 2

0.2 0 0.2 0.4 Miles

Preliminary Map
Coordinate System
UTM Zone 15, NAD 83

Sample Locations for August 1-2, 2000
supported by GPS Locational Data

FIELDS



Legend

○ = **Outdoor surface soil sampling location**

★ = **Indoor insulation sample**

ecology and environment, inc.

Region 5 - Superfund Technical Assessment and Response Team
33 North Dearborn, Suite 900, Chicago, Illinois 60602

Title:	Figure:
Sample Location Map	3
Site:	Scale:
Western Mineral Processing	Not to Scale
City: / State:	Date:
Minneapolis / Minnesota	7/13/00

ecology and environment, inc.

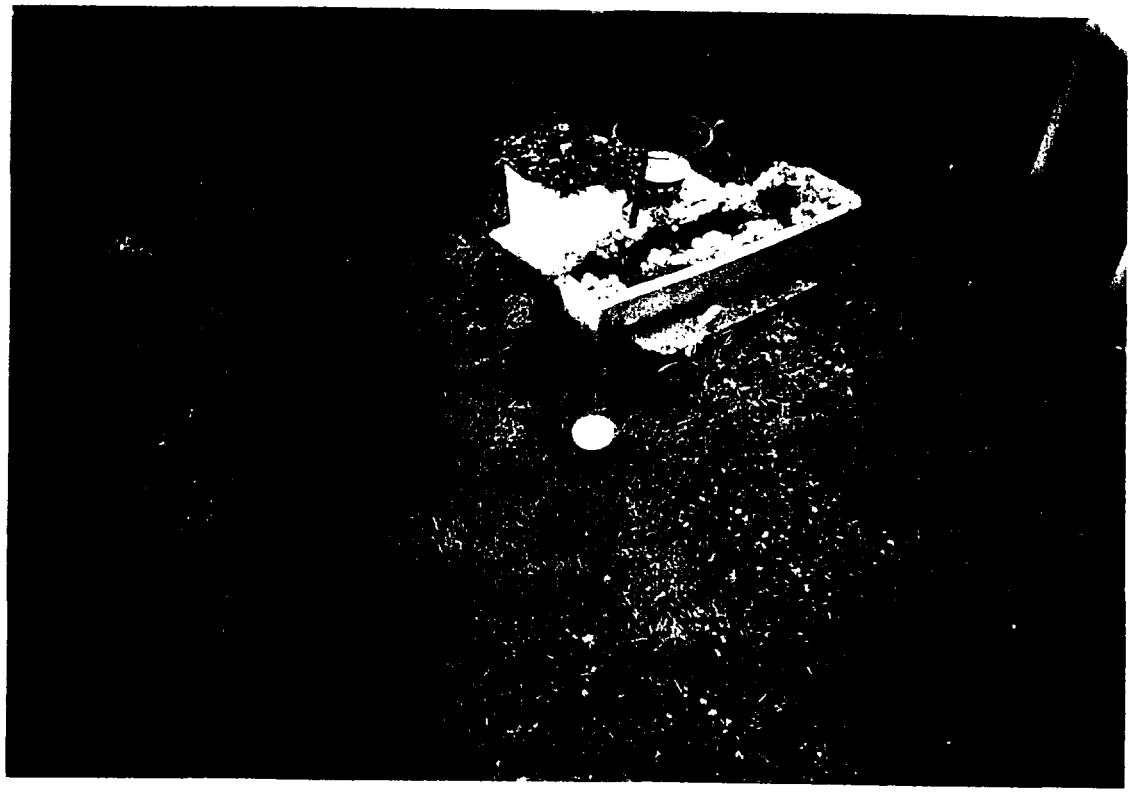
Region 5 - Superfund Technical Assessment and Response Team

33 North Dearborn, Suite 900, Chicago, Illinois 60602

Title:	Figure:
Visual Evidence of Amphibole Asbestos	4
Site:	Scale:
Western Mineral Processing	Not to Scale
City: State:	Date:
Minneapolis Minnesota	6/21/00

Attachment B

Photodocumentation



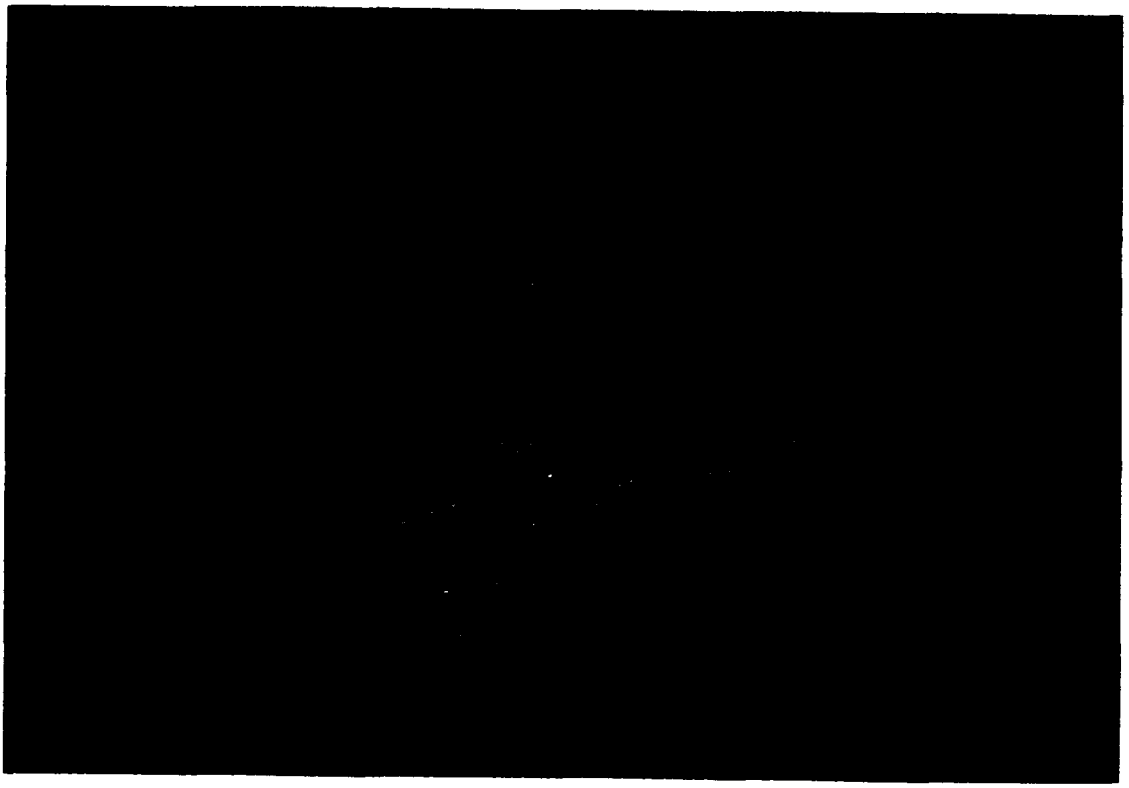
Site: WMP **Date:** June 22, 2000 **Time:** 0952
Location: Minneapolis, MN **Direction:** Southeast **Photographer:** V. Gee
Subject: NON RESPONSIVE [redacted]

Site: WMP **Date:** June 22, 2000 **Time:** 1030
Location: Minneapolis, MN **Direction:** North **Photographer:** V. Gee
Subject: NON RESPONSIVE [redacted]

Site: WMP **Date:** June 22, 2000 **Time:** 1111
Location: Minneapolis, MN **Direction:** East **Photographer:** V. Gee
Subject: NON RESPONSIVE [redacted]

Site: WMP **Date:** June 22, 2000 **Time:** 1150
Location: Minneapolis, MN **Direction:** West **Photographer:** G. Daley
Subject: NON RESPONSIVE [redacted]

Site: WMP **Date:** June 22, 2000 **Time:** 1219
Location: Minneapolis, MN **Direction** East **Photographer:** G. Daley
Subject: NON RESPONSIVE [redacted]



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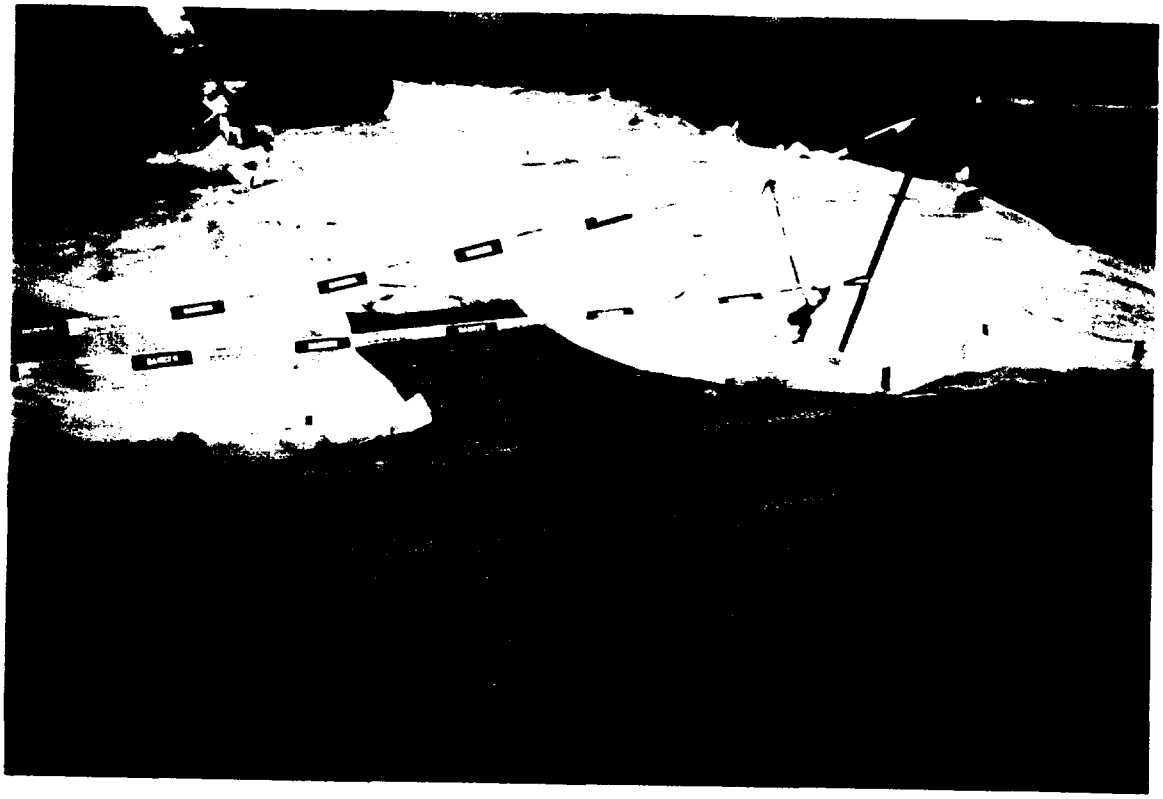
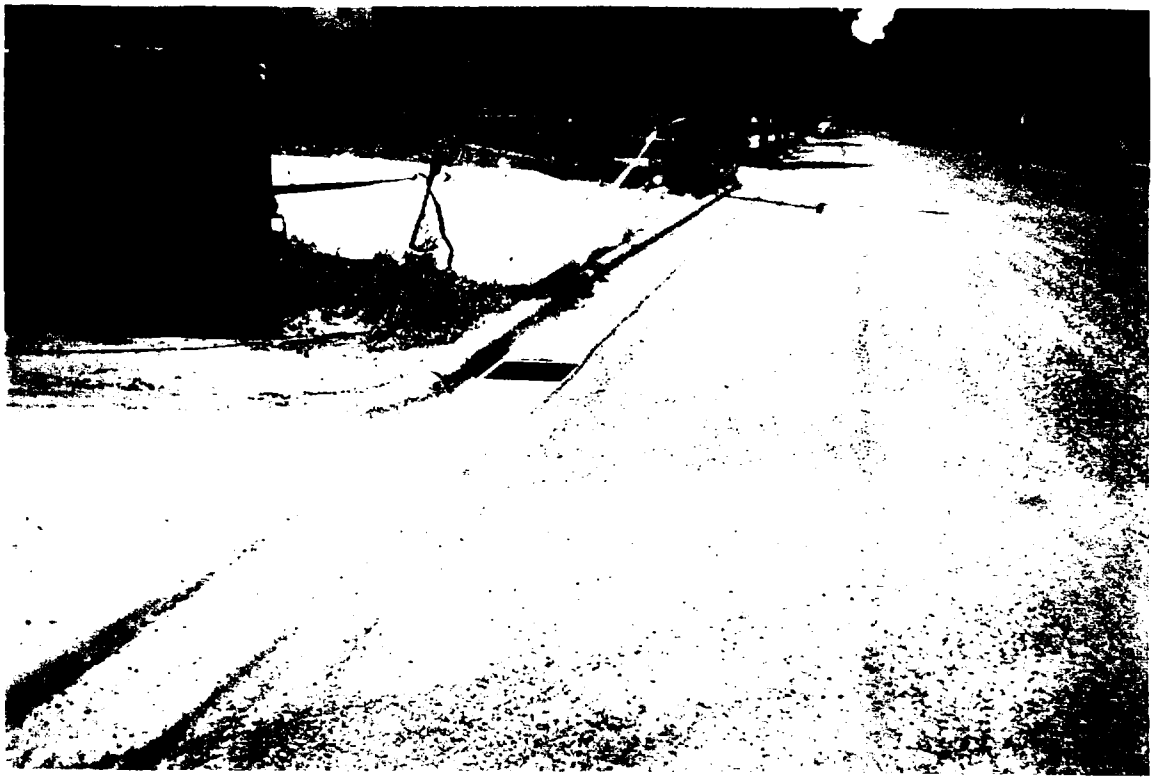
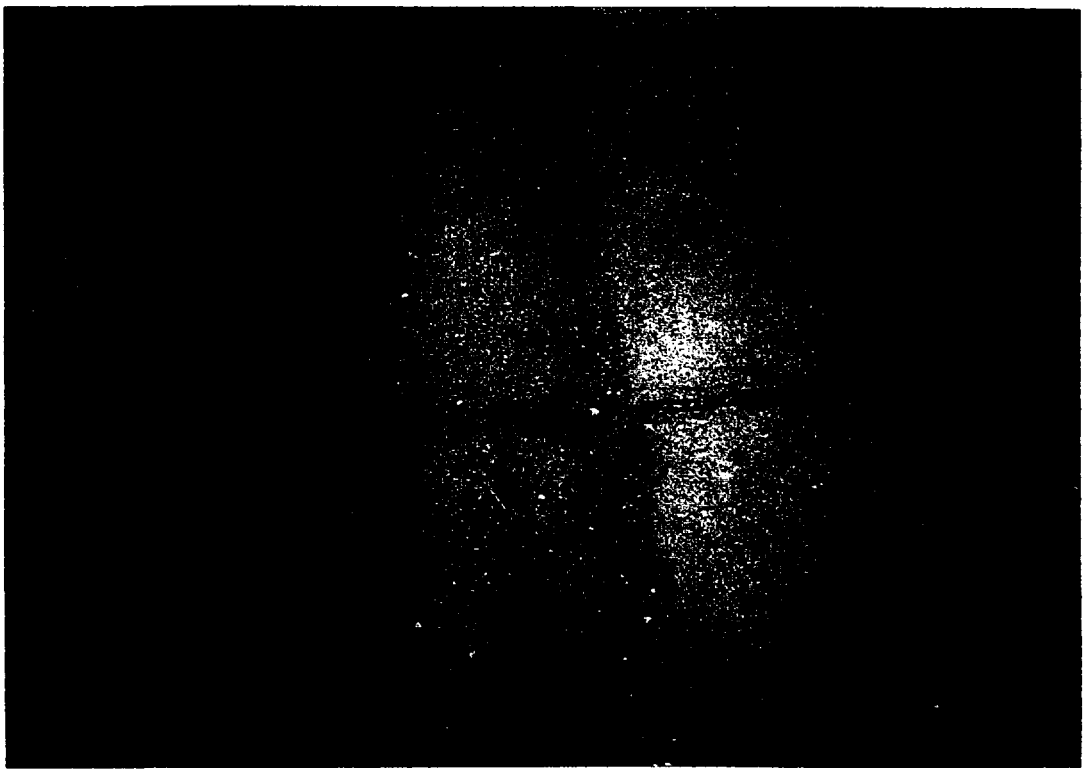
Location: Minneapolis, MN **Direction** East **Photographer:** G. Daley
Subject: NON RESPONSIVE [redacted]



Site:	WMP	**Date:**	June 22, 2000	**Time:**	1225
Location:	Minneapolis, MN	**Direction:**	Southeast	**Photographer:**	G. Daley
Subject:	NON RESPONSIVE				

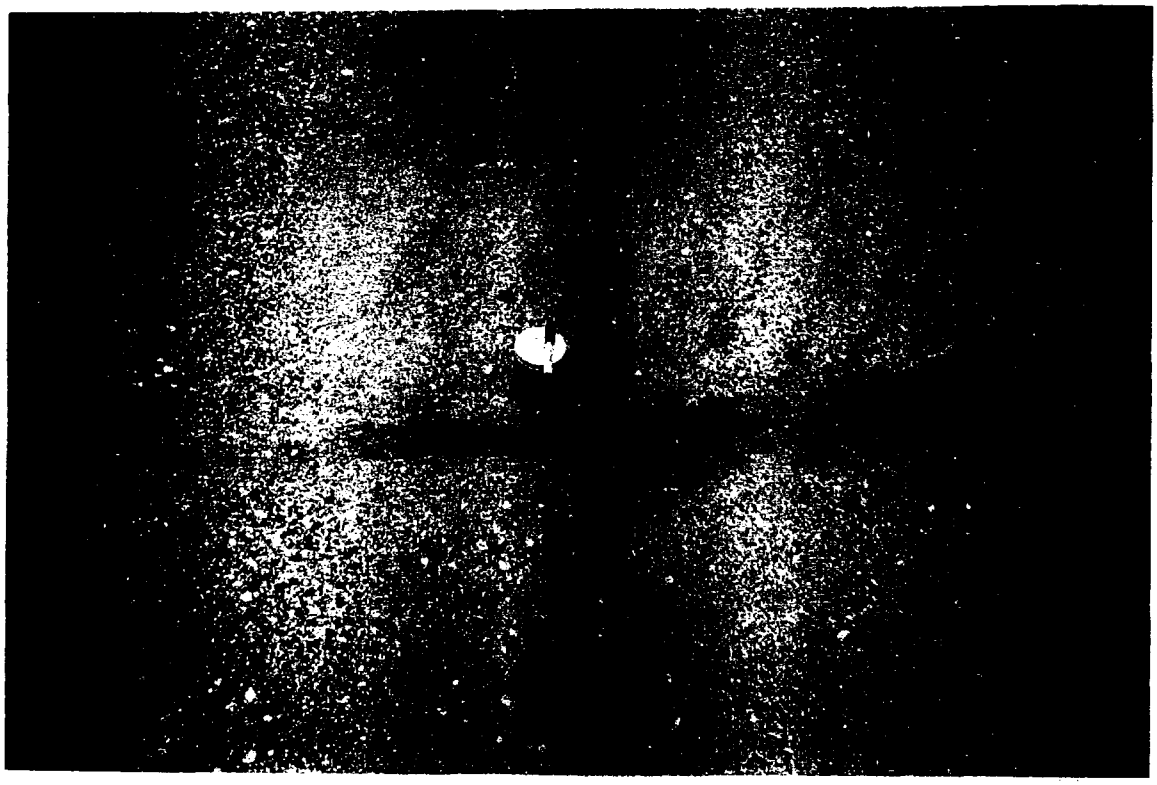


Site:	WMP	**Date:**	June 22, 2000	**Time:**	1225
Location:	Minneapolis, MN	**Direction:**	Southeast	**Photographer:**	G. Daley
Subject:	NON RESPONSIVE				

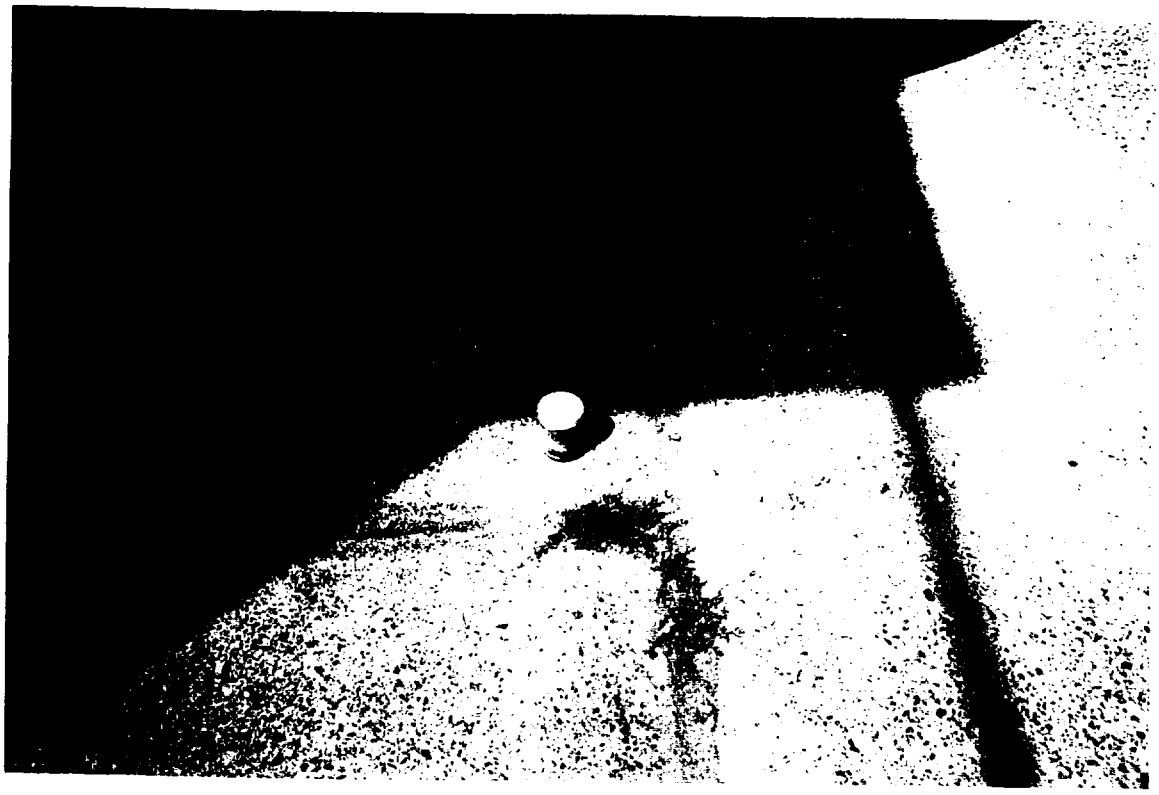


Site: WMP **Date:** August 1, 2000 **Time:** 1415
Location: Minneapolis, MN **Direction:** North **Photographer:** V. Gee
Subject: NON RESPONSIVE [redacted]

Site: WMP **Date:** August 1, 2000 **Time:** 1445
Location: Minneapolis, MN **Direction:** North **Photographer:** T. Campbell
Subject: NON RESPONSIVE [redacted]



Site: WMP **Date:** August 1, 2000 **Time:** 1445
Location: Minneapolis, MN **Direction:** North **Photographer:** V. Gee
Subject: S NON RESPONSIVE [redacted]



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Location: Minneapolis, MN **Direction:** North **Photographer:** T. Campbell
Subject: NON RESPONSIVE [redacted]

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Location: Minneapolis, MN **Direction:** East **Photographer:** V. Gee
Subject: NON RESPONSIVE [redacted]

Site: WMP **Date:** August 1, 2000 **Time:** 1515
Location: Minneapolis, MN **Direction:** down **Photographer:** T. Campbell
Subject: NON RESPONSIVE [redacted]

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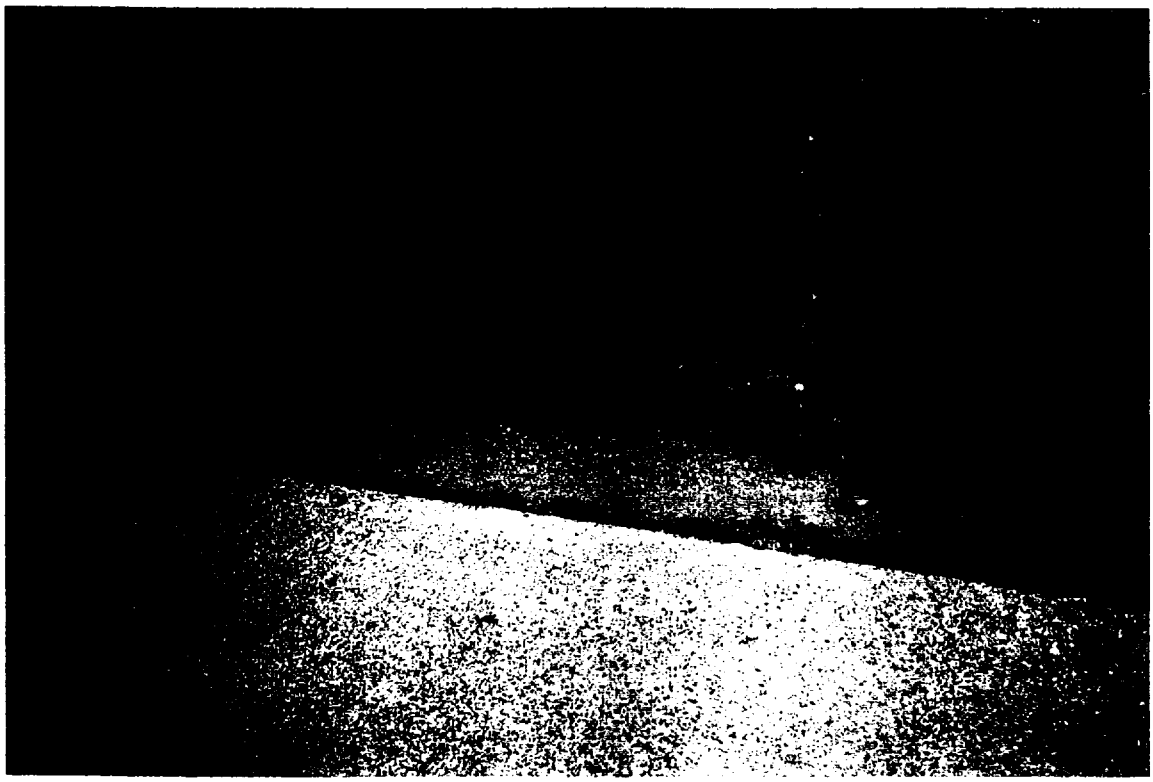
Location: Minneapolis, MN **Direction:** East **Photographer:** V. Gee
Subject: NON RESPONSIVE [redacted]



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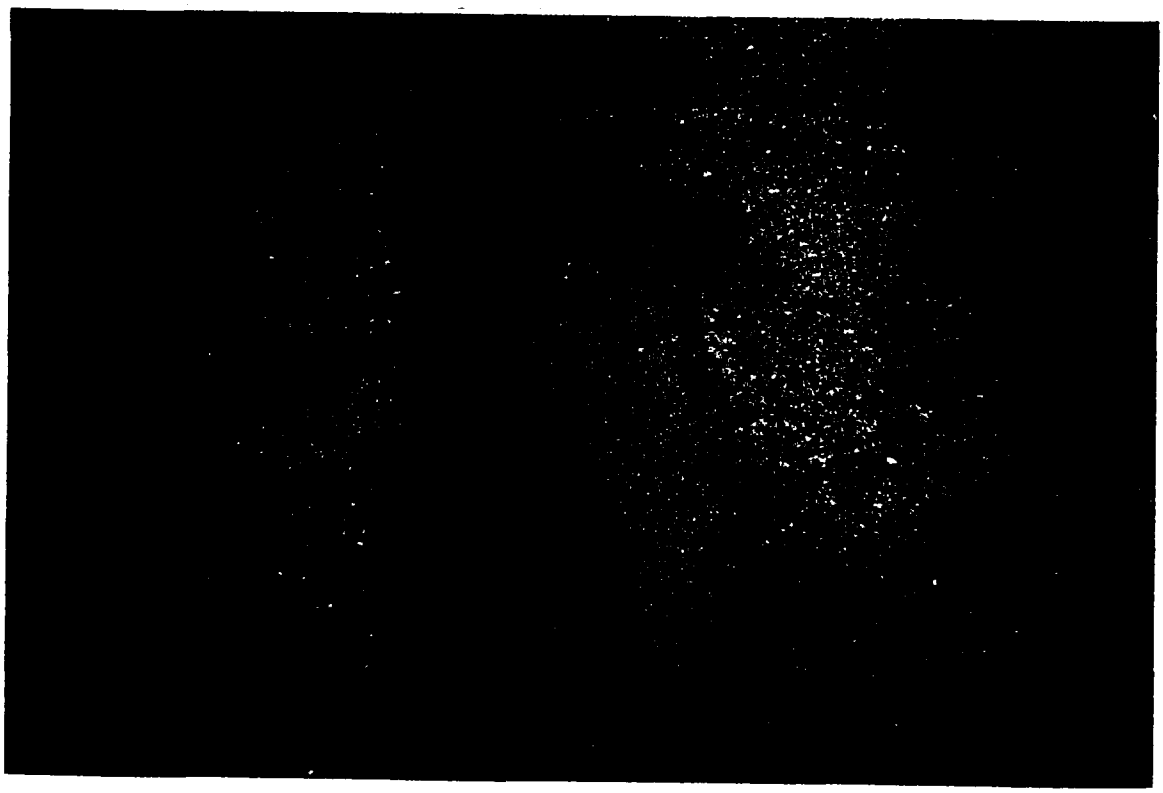
Location: Minneapolis, MN **Direction:** East **Photographer:** T. Campbell
Subject: NON RESPONSIVE [redacted]

Site: WMP **Date:** August 1, 2000 **Time:** 1650
Location: Minneapolis, MN **Direction:** North **Photographer:** T. Campbell
Subject: NON RESPONSIVE [redacted]



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Location: Minneapolis, MN **Direction:** North **Photographer:** T. Campbell
Subject: NON RESPONSIVE [redacted]

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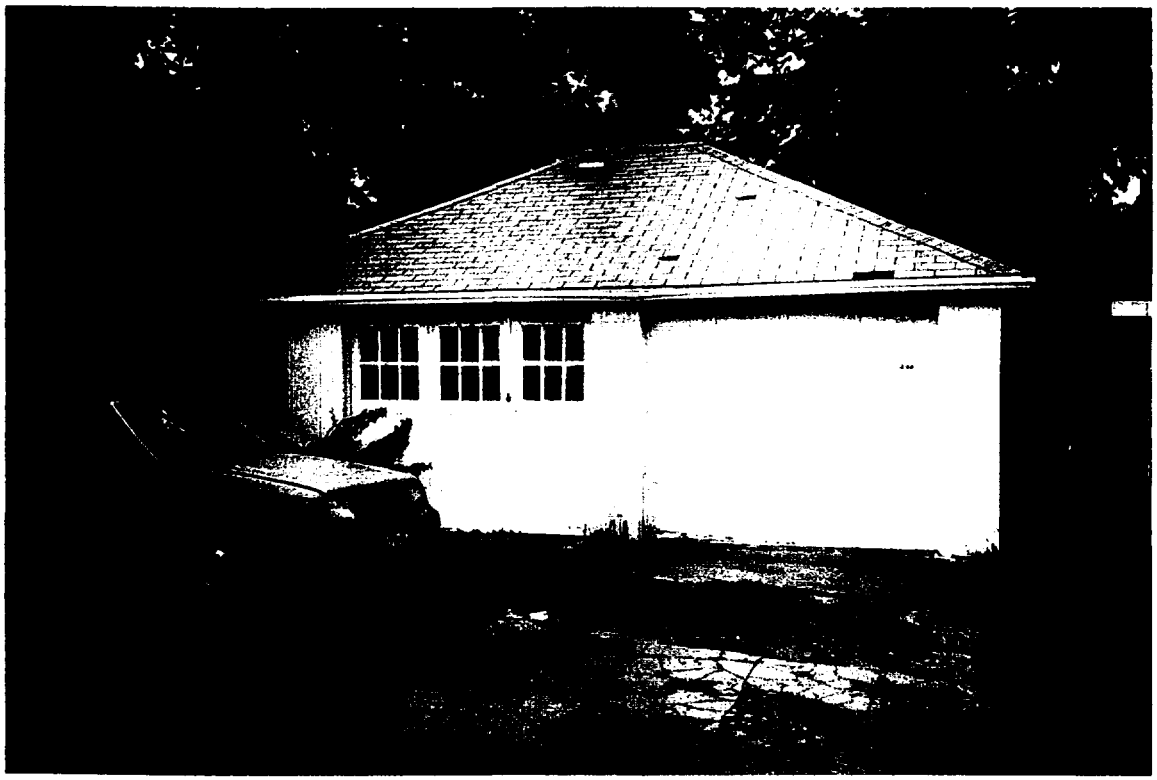
Location: Minneapolis, MN **Direction:** North **Photographer:** T. Campbell
Subject: NON RESPONSIVE [redacted]



Site: WMP **Date:** August 1, 2000 **Time:** 1652
Location: Minneapolis, MN **Direction** West **Photographer:** T. Campbell
Subject: NON RESPONSIVE [redacted]

Site: WMP **Date:** August 1, 2000 **Time:** 1657
Location: Minneapolis, MN **Direction:** South **Photographer:** V. Gee
Subject: NON RESPONSIVE [redacted]

Site: WMP **Date:** August 1, 2000 **Time:** 1659
Location: Minneapolis, MN **Direction:** East **Photographer:** V. Gee
Subject: NON RESPONSIVE [redacted]

Site: WMP
Location: Minneapolis, MN
Subject: NON RESPONSIVE [redacted]
Date: August 1, 2000
Direction: West
Time: 1700
Photographer: V. Gee

Site: WMP
Location: Minneapolis, MN
Subject: NON RESPONSIVE [redacted]
Date: August 1, 2000
Direction: West
Time: 1715
Photographer: V. Gee

Site: WMP **Date:** August 1, 2000 **Time:** 1730
Location: Minneapolis, Mn **Direction:** West **Photographer:** V. Gee
Subject: NON RESPONSIVE [redacted]

Site: WMP **Date:** August 2, 2000 **Time:** 0955
Location: Minneapolis, MN **Direction:** East **Photographer:** V. Gee
Subject: NON RESPONSIVE [redacted]

Site: WMP **Date:** August 2, 2000 **Time:** 1030
Location: Minneapolis, MN **Direction:** West **Photographer:** V. Gee
Subject: NON RESPONSIVE [redacted]

Site: WMP **Date:** August 2, 2000 **Time:** 1050
Location: Minneapolis, MN **Direction:** West **Photographer:** T. Campbell
Subject: NON RESPONSIVE [redacted]

Site: WMP **Date:** August 1, 2000 **Time:** 1108
Location: Minneapolis, MN **Direction:** East **Photographer:** T. Campbell
Subject: NON RESPONSIVE [redacted]

Attachment C

Tables

Table 1

SOIL and BUILDING MATERIAL ANALYTICAL RESULTS
WESTERN MINERAL PROCESSING
MINNEAPOLIS, HENNEPIN, MINNESOTA
MARCH 8, 2000

Sample ID	Location	Sample Date	Material ID	Type of Asbestos	Percent Asbestos
BS-1	West area	3-8-00	Vermiculite Insulation	ND	<1% Trace
BS-2	Central	3-8-00	Vermiculite Insulation	ND	<1% Trace
OS-3	East Side	3-8-00	Soil	ND	<1% Trace
OS-4	East near silo	3-8-00	Soil	ND	<1% Trace

Key : ND = None Detected.
Trem-Act = Tremolite - Actinolite.
<1 % = Less than 1% visual estimate.

Source : EMSL Analytical Laboratories, Indianapolis, Indiana (analytical TDD S05-0003-805).

Table 2

SOIL & BUILDING MATERIAL ANALYTICAL RESULTS
WESTERN MINERAL PROCESSING
MINNEAPOLIS, HENNEPIN, MINNESOTA
APRIL 13, 2000

Sample ID	Location	Sample Date	Material ID	Type of Asbestos	Percent Asbestos
BS-5-WMIN	Above drop ceiling	4-13-00	Vermiculite Insulation	Trem-Act	0
BS-6-WMIN	Above drop ceiling	4-13-00	Vermiculite Insulation	Trem-Act	0
OS-8-WMIN	North side of building	4-13-00	Soil	Trem-Act	8
OS-1-SS	R/R spur behind building	4-13-00	Soil	Chrysotile Trem-Act	2 Trace
OS-7	Small trench behind building	4-13-00	Soil	Trem-Act	20

Key : ND = None Detected.
Trem-Act = Tremolite - Actinolite.
<1 % = Less than 1% visual estimate.

Source : Reservoirs Environmental Services, Inc., Denver, Colorado (analytical TDD S05-0005-805).

Attachment D

Analytical Results

ecology and environment, inc.
International Specialists in the Environment

33 North Dearborn Street
Chicago, Illinois 60602
Tel. 312/578-9243, Fax: 312/578-9345

M E M O R A N D U M

DATE: July 14, 2000

TO: Vincent Gee, START Project Manager, E & E, Chicago, Illinois

FROM: David Hendren, START Analytical Services Manager, E & E, Chicago, Illinois

THROUGH: Patrick Zwilling, START Assistant Program Manager, E & E, Chicago, Illinois

SUBJECT: Data Quality Review for Asbestos, Western Mineral Processing, Minneapolis, Hennepin County, Minnesota

REFERENCE: Project TDD S05-0002-014 Analytical TDD S05-0003-805
Project PAN 0F1401SIXX Analytical PAN 0MAE01TAXX

The data quality assurance (QA) review of five solid samples collected from the Western Mineral Processing site is complete. The samples were collected on March 8, 2000, by the Superfund Technical Assessment and Response Team (START) contractor, Ecology and Environment, Inc. (E & E). The samples were submitted to Reservoirs Environmental Services, Inc., Denver, Colorado. The laboratory analyses were performed according to the United States Environmental Protection Agency (U.S. EPA) Method 600/R-93/116 for analysis using polarized light microscopy (PLM) and by transmission electron microscopy (TEM).

Sample Identification

START Identification No.	Laboratory Identification No.
BS-1	N/A
BS-2	N/A
OS-3	N/A
OS-4	N/A

Data Qualifications:

I. Sample Holding Time: Acceptable

The samples were collected on April 13, 2000, and analyzed on June 14, 2000. The Office of Solid Waste and Emergency Response (OSWER) Directive 9360.4-01 (April 1990) does not specify holding times for these parameters.

II. Overall Assessment of Data for Use: Acceptable

The overall usefulness of the data is based on criteria for QA Level II as outlined in OSWER Data Validation Procedures, Section 9.0, Generic Data Validation Procedures. Based upon the information provided, the data are acceptable for use.

EMSL Analytical, Inc.

Address:6330 E. 75th St.,Suite 152
Address: Indianapolis, IN 46250
Phone: 317-570-5892
Fax: 317-570-5894

March 22, 2000

Client Name	**Ecology & Environment**
Address	33 North Dearborn Street, Floor 9
Address	Chicago, IL 60652

Project: **0002-014**
Attention: **Dave Hendren**
Ref Number: **IN001134**

Analysis of Bulk Samples Performed by Transmission Electron Microscopy (TEM) Chatfield Method

SOP-1988-02 Revision 03

Client Sample ID	Sample Description	Sample Color	Percent Matrix Material	Percent Non Asbestos Fibers	Percent Asbestos (Chrysotile)	
					Range	Mean
BS-1	Insulation (West Area)	Tan	17 %	NSD	< 1 % Trace Tremolite/Actinolite	< 1 % Trace Tremolite/Actinolite
BS-2	Insulation (Central)	Brown	9 %	NSD	< 1 % Trace Tremolite/Actinolite	< 1 % Trace Tremolite/Actinolite
OS-3	Ground Sample East Side	Brown	18 %	NSD	< 1 % Trace Tremolite/Actinolite/ Chrysotile	< 1 % Trace Tremolite/Actinolite/ Chrysotile
OS-4	Ground Sample East Neay Cylo	Brown	16 %	NSD	< 1 % Trace Tremolite/Actinolite/ Chrysotile	< 1 % Trace Tremolite/Actinolite/ Chrysotile

Analyst

Laboratory Manager

ACCREDITATIONS: NVLAP #200188

EMSL Analytical, Inc.

6330 E. 75th St., Suite 152
Indianapolis, IN 46250
Phone: (317) 570-5892 Fax: (317) 570-5894

Attn.: D. Hendren
Ecology & Environment
33 North Dearborn Street
Floor 9
Chicago, IL 60652

Wednesday, March 15, 2000

Ref Number: IN001133

POLARIZED LIGHT MICROSCOPY (PLM)

Performed by EPA 600/R-93/116 Method*

Project: 0002-014

Sample	Location	Appearance	Sample Treatment	ASBESTOS % Type	NON-ASBESTOS % Fibrous	% Non-Fibrous
BS-1		Brown Non-Fibrous Homogeneous	Teased	< 1% Actinolite	None Detected	99% Mica 1% Other
BS-2		Brown Non-Fibrous Homogeneous	Crushed	None Detected	None Detected	99% Mica 1% Other
BS-3		Black Fibrous Homogeneous	Teased/Crushed	None Detected	10% Cellulose	90% Other
BS-4		Black Fibrous Homogeneous	Teased/Crushed	None Detected	10% Cellulose	90% Other

Comments: For all obviously heterogeneous samples easily separated into subsamples, and for layered samples, each component is analyzed separately. Also, "# of Layers" refers to number of separable subsamples.

* NY samples analyzed by ELAP 198.1 Method.

Craig Nixon
Analyst

Approved
Signatory

ecology and environment, inc.
International Specialists in the Environment

33 North Dearborn Street
Chicago, Illinois 60602
Tel. 312/578-9243, Fax: 312/578-9345

M E M O R A N D U M

DATE: July 14, 2000

TO: Vincent Gee, START Project Manager, E & E, Chicago, Illinois

FROM: David Hendren, START Analytical Services Manager, E & E, Chicago, Illinois

THROUGH: Patrick Zwilling, START Assistant Program Manager, E & E, Chicago, Illinois

SUBJECT: Data Quality Review for Asbestos, Western Mineral Processing, Minneapolis, Hennepin County, Minnesota

REFERENCE: Project TDD S05-0002-014 Analytical TDD S05-0005-805
Project PAN 0F1401SIXX Analytical PAN 0YAE01TAXX

The data quality assurance (QA) review of five solid samples collected from the Western Mineral Processing site is complete. The samples were collected on April 13, 2000, by the Superfund Technical Assessment and Response Team (START) contractor, Ecology and Environment, Inc. (E & E). The samples were submitted to Reservoirs Environmental Services, Inc., Denver, Colorado. The laboratory analyses were performed according to the United States Environmental Protection Agency (U.S. EPA) Method 600/R-93/116 for analysis using polarized light microscopy (PLM) and by transmission electron microscopy (TEM).

Sample Identification

START Identification No.	Laboratory Identification No.
BS-5-WMIN	EM 484374
BS-6-WMIN	EM 484375
OS-8-WMIN	EM 484376
OS-1-SS	EM 484377
0S-7	EM 488970

Data Qualifications:

I. Sample Holding Time: Acceptable

The samples were collected on April 13, 2000, and analyzed on June 14, 2000. The Office of Solid Waste and Emergency Response (OSWER) Directive 9360.4-01 (April 1990) does not specify holding times for these parameters.

II. Overall Assessment of Data for Use: Acceptable

The overall usefulness of the data is based on criteria for QA Level II as outlined in OSWER Data Validation Procedures, Section 9.0, Generic Data Validation Procedures. Based upon the information provided, the data are acceptable for use.

NVLAP LAB NO. 101896

ASBESTOS - TEM, PCM, PLM, SEM
METALS - AA. FLAME/FURNACE
AIRBORNE PARTICULATES
SPECIAL PARTICLE ANALYSIS

A LAB I.D. 101533

RESERVOIRS ENVIRONMENTAL SERVICES, INC.

1827 GRANT STREET DENVER, COLORADO 80203-1107 (800) 678-7374 (303) 830-1966 FAX (303) 863-9196

July 6, 2000

Mr. Timothy Calloway
Ecology & Environment, Inc.
33 N. Dearborn Street
Suite 900
Chicago, IL 60602

RE: RES Job No. 69244-1 – KJO5, S05-005-805 – Bulk Samples: BS-5-WMIN, BS-6-WMIN, OS-6-WMIN and OS-1-SS. Sample Received but not Analyzed: OS-8-WMIN.

Dear Mr. Calloway:

Reservoirs Environmental Services, Inc. (RES, Inc.) has analyzed four bulk material samples by Polarized Light Microscopy (PLM) followed by Transmission Electron Microscopy (TEM) and Energy Dispersive X-ray Spectrometry (EDX) to confirm the type of asbestos mineral present. The samples were received on May 17, 2000 and initial PLM results were telephoned to your office within five days of receipt.

PLM was used to analyze the bulk material samples in compliance with guidelines established by the USEPA (EPA/600/R-93/116). Amphibole asbestos was found in each of the four samples analyzed. Samples BS-5-WMIN and BS-6-WMIN were tan processed vermiculite samples. The fibers were small and difficult to find. No difference was noted between these two samples. Sample OS-6-WMIN was a brown soil sample with relatively large pieces of amphibole asbestos mixed in the soil. Sample OS-1-SS was a brown unprocessed mica sample with silver paint chips. Chrysotile asbestos was found in the silver paint. The PLM results are presented in Table I.

TEM/EDX revealed amphibole fibers in each of the four samples analyzed. An estimation of concentration was not made during the TEM analysis although the fibers were frequent and easy to find in each sample preparation. The fibers varied slightly in elemental composition but were generally in the Tremolite –

Actinolite solid solution series. A sodium peak was present in many of the fibers. Sodium combined with a smaller Calcium peak is consistent with the mineral Ricterite found in the some vermiculite deposits. A minor Potassium peak was also present in many of the fibers. Characteristic X-ray spectra are in Attachment I. Electron micrographs of the fibers are in Attachment II.

RES. Inc. has assigned job number RES 69244-1 to this study. This report is considered highly confidential and the sole property of Ecology & Environment, Inc. RES, Inc. will not discuss any part of this study with personnel other than those of the client. The results described in this report only apply to the samples analyzed. Samples will be disposed of after sixty days unless longer storage is requested. This report must not be used to claim endorsement of products or analytical results by NVLAP or any agency of the U.S. Endorsement. Only the PLM results contained in this report are subject to NVLAP accreditation, other information presented is not NVLAP accredited.

If you should have any questions about this report, Please feel free to call me at (303) 830-1986.

Sincerely,

Jeanne Spencer Orr
President

PLM Analyst, Paul D. LoScalzo

RESERVOIRS ENVIRONMENTAL SERVICES, INC.

NVLAP Accredited Laboratory #1896 TDH 30-0136

TABLE I. PLM BULK ANALYSIS, PERCENTAGE COMPOSITION BY VOLUME

RES Job Number: **RES 69244-1**
Client: **Ecology & Environment, Inc.**
Client Project: **KJ05, S05-005-805**
Date Samples Received: **May 17, 2000**
Analysis Type: **Miscellaneous PLM, Bulk**
Turnaround: **3-5 Day**

Client Sample Number	Lab ID Number	Layer	Physical Description	Portion of Total Sample (%)	ASBESTOS CONTENT BY LAYER Mineral	ASBESTOS CONTENT BY LAYER Visual Estimate (%)	Non-Asbestos Fibrous Components (%)	Non-Fibrous Components (%)
BS-5-WMIN	EM 484374	A	Tan vermiculite	100	**Trem-Act**	TR	0	100
BS-6-WMIN	EM 484375	A	Tan vermiculite	100	**Trem-Act**	TR	0	100
OS-8-WMIN	EM 484376	A	Brown soil	100	**Trem-Act**	8	2	90
OS-1-SS	EM 484377	A	Brown micaceous material	100	**Chrysotile** **Trem-Act**	2 TR	5	93
OS-8-WMIN	EM 484378		Not Analyzed					

ND = None Detected
TR = Trace, < 1% Visual Estimate
Trem-Act = Tremolite-Actinolite
Point Count Trace = Observed but not countable under protocol, < 0.25%
Analyst: PDL
Data QA

ATTACHMENT I

Energy Dispersive X-Ray Spectra

QUALITATIVE ELEMENT IDENTIFICATION

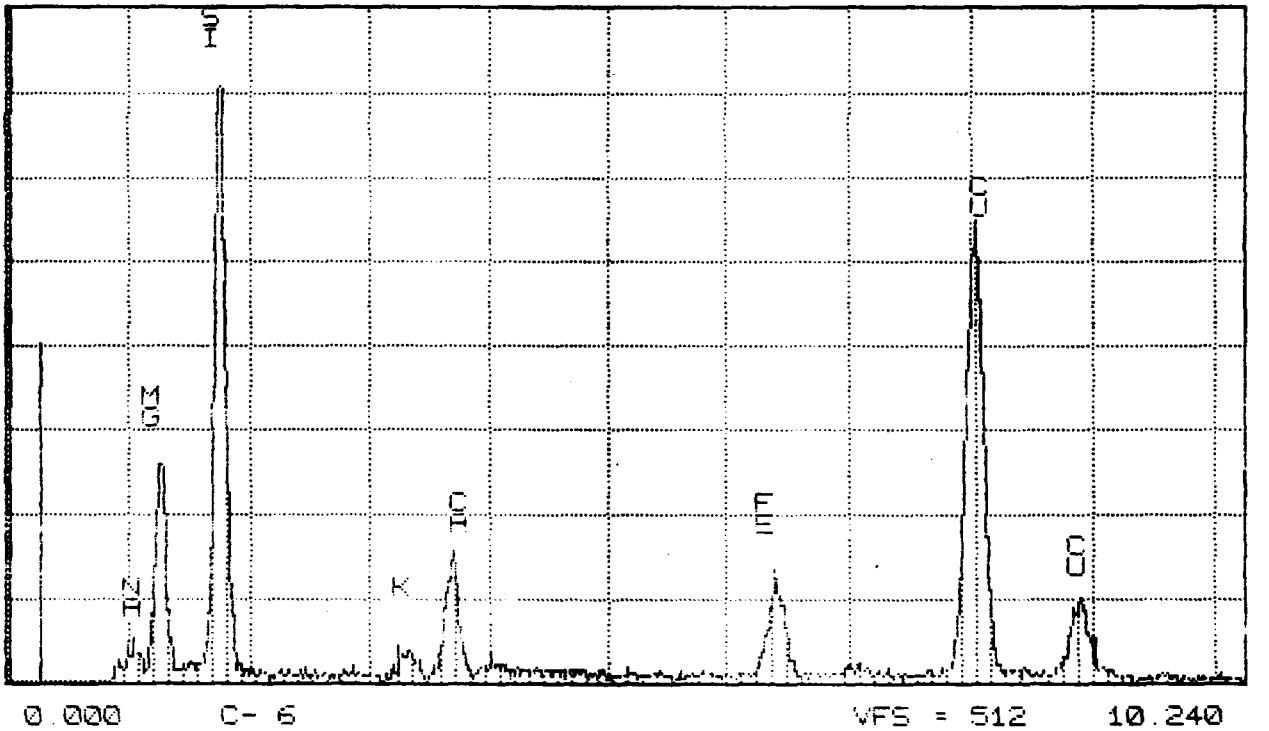
[illegible]

POSSIBLE IDENTIFICATION
SI KA OR RB LA?
CU KA KB
MG KA OR AS LA?
CA KA
FE KA
K KA OR IN LA?
NA KA

PEAK LISTING

	ENERGY	AREA	EL. AND LINE
1	0.996	78	NA KA
2	1.256	1031	MG KA OR AS LA?
3	1.743	3084	SI KA OR RB LA?
4	3.309	157	K KA OR IN LA?
5	3.689	667	CA KA
6	6.396	575	FE KA
7	8.030	2754	CU KA
8	8.888	446	CU KB

TN-5502 RESERVOIRS ENVIRONMENTAL se THU 25-MAY-00 18:37
Cursor: 0.020keV = 0



0.000 C- 6 VFS = 512 10.240
60 484374

QUANTITATIVE ELEMENT IDENTIFICATION

SAMPLE ID:484375

POSSIBLE IDENTIFICATION:
SI KA OR RB LA?
CU KA KB
MG KA OR AS LA?
CA KA KB
FE KA
K KA OR LA?
NA KA
V KA

PEAK LISTING

	ENERGY	AREA	EL. AND LINE
1	1.000	352	NA KA
2	1.250	3974	MG KA OR AS LA?
3	1.734	13979	SI KA OR RB LA?
4	3.299	733	K KA OR IN LA?
5	3.680	1435	CA KA
6	3.998	191	CA KB
7	4.951	174	V KA
8	6.384	925	FE KA
9	8.020	6119	CU KA
10	8.879	888	CU KB

TN-5502 RESERVOIRS ENVIRONMENTAL se FRI 26-MAY-00 08:56

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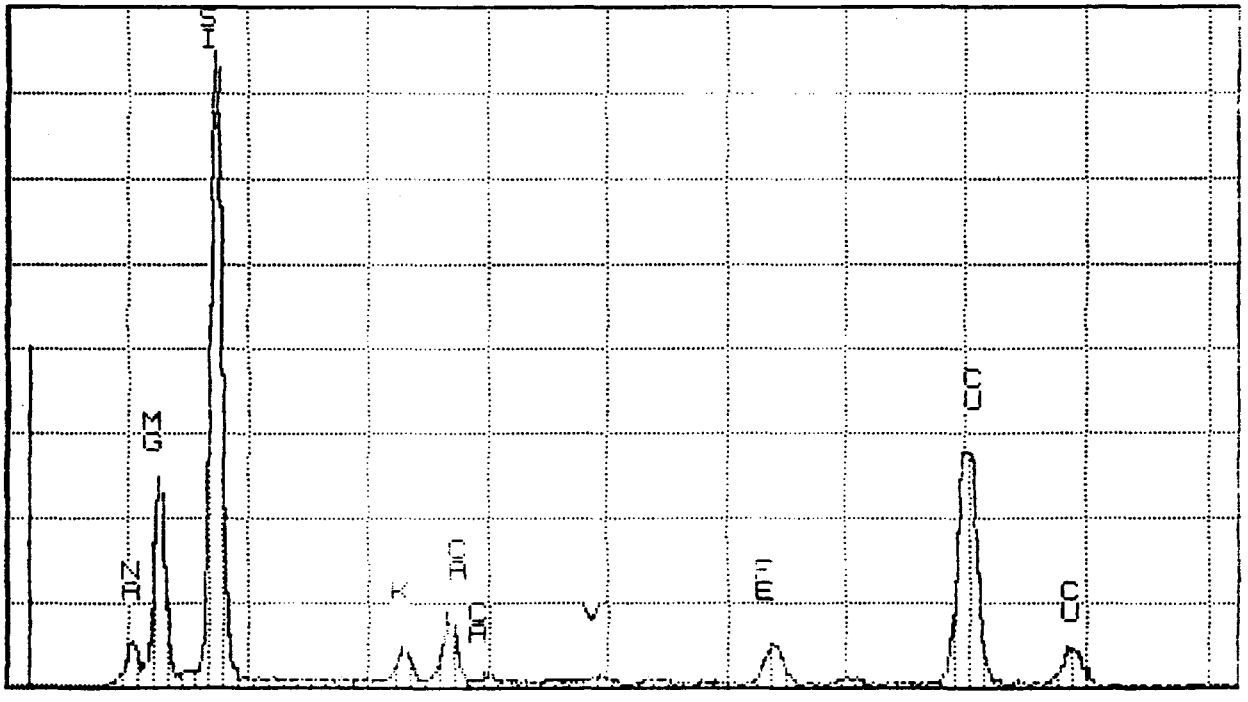


0.000 B- 5 VFS = 2048 10.240

60 484375

QUALITATIVE ELEMENT IDENTIFICATION

SAMPLE ID:484376A

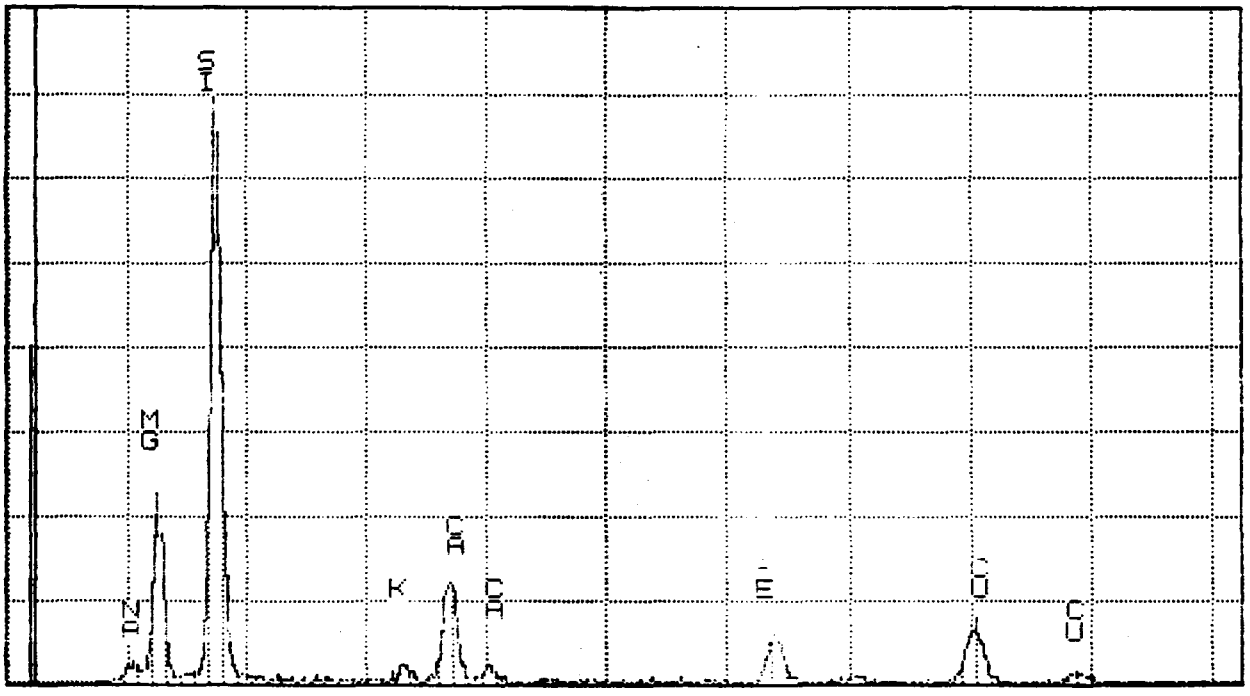
POSSIBLE IDENTIFICATION
SI KA OR RB LA?
MG KA OR AS LA?
CA KA KB
CU KA KB
FE KA
K KA OR IN LA?
NA KA

PEAK LISTING

	ENERGY	AREA	EL. AND LINE
1	0.997	61	NA KA
2	1.256	1778	MG KA OR AS LA?
3	1.741	5959	SI KA OR RB LA?
4	3.309	156	K KA OR IN LA?
5	3.692	1187	CA KA
6	4.029	152	CA KB
7	6.386	581	FE KA
8	8.025	694	CU KA
9	8.884	125	CU KB

TN-5502 RESERVOIRS ENVIRONMENTAL se FRI 26-MAY-00 12:07

Cursor: 0.220keV = 0



0.000 B- 5 Kα = 0.19keV VFS = 1024 10.240

138 484376

ATTACHMENT II

Electron Micrographs

Figure 1: Electron micrograph of vermiculite plates with amphibole fibers found in sample BS-5-WMIN. Magnification 5000X.

Figure 2: Electron Micrograph of vermiculite plates with amphibole fibers found in sample BS-6-WMIN. Magnification 5000X.

Figure 3: Amphibole fibers found in sample OS-8-WMIN. Magnification 10,000X.

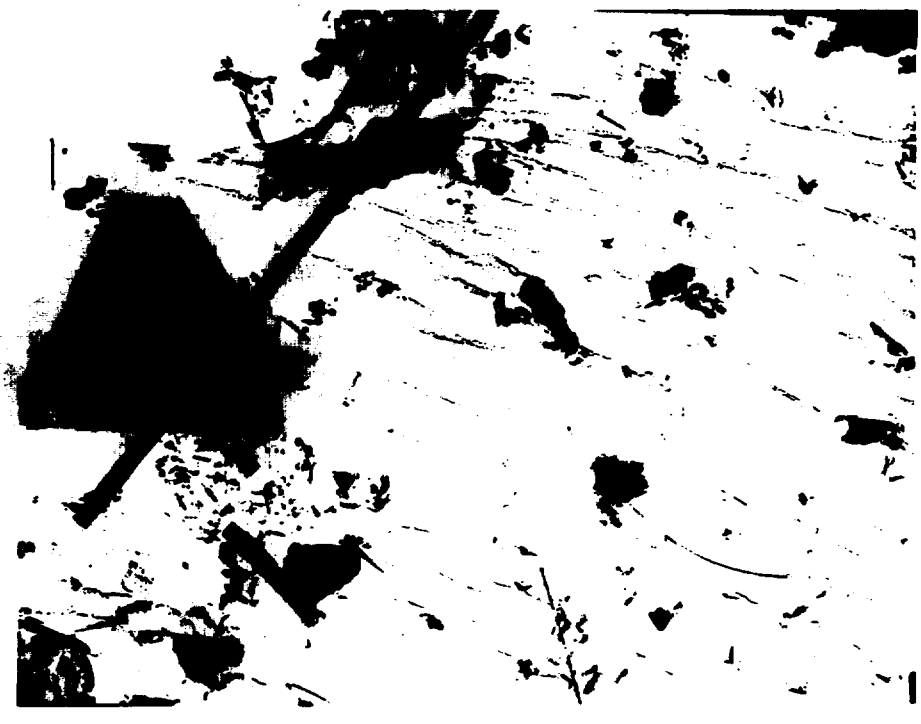


Figure 4: Electron Micrograph of mica plates with amphibole fibers and thin chrysotile fibers. Magnification 10,000X

ENVIRONME[illegible] PROTECTION AGENCY
Office of Enforcement

F[illegible] N 5
77 West Jackson Boulevard
Chicago, Illinois 60604

CHAIN OF CUSTODY RECORD

PROJ. NO.	PROJECT NAME
KJ05	S05-005-805

SAMPLERS: *(Print Name and Sign)*
Eric Reuscher

STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CON-TAINERS	Analyte: ASBESTOS						TAG NUMBERS
BS-5-WMIN	4/13	0945		X	Above Drop Ceiling	1/ 8oz	X						Turnaround Time 7day Verbal
BS-6-WMIN	4/13	0945		X	" " "	1/ 8oz	X						" " 14 day Hardcopy
OS-8-WMIN	4/13	0960		X	From North side of Building	2/ 8oz	X						
OS-1-SS	4/13	1100		X	R/R Spur behind Building (Harding)	1/ 8oz	X						Send Results to: Dave Hendren
													Ecology & Environment, Inc.
													33 N. Dearborn St. Suite-900
													Chicago, IL. 60602 Ph#(312)578-9243
													Fax#(312)578-9345

Activity Code:

Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*
		Timothy Calloway
Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*
Relinquished by: *(Signature)* Timothy Calloway	Date / Time 5/16/00 1105	Received for Laboratory by: *(Signature)* S. Kahle

Date / Time: 5/17/00 9:50am

Ship To: Reservoir Environmental Services
1827 Grant St.
Denver, CO. 80203
(303)830-1986
ATTN: Jeanne Orr

Airbill Number: 810252086803

Chain of Custody Seal Numbers: 25565

Distribution: White - Accompanies Shipment; Pink - Coordinator Field Files; Yellow - Laboratory File

(X)

Page ___ of ___

RESERVOIRS ENVIRONMENTAL SERVICES, INC.

1827 GRANT STREET
DENVER, CO 80203

Phone: (303) 830-1986 Fax: (303) 863-9196 WATS: 1-800-678-7374
PAGER: 509-0964, 509-4125 and 509-5406 AFTER HOURS USE ONLY

RESI Job #: RES 69244

Due Date: 5/23/02
Due Time: 9:30am

SAMPLES SUBMITTED BY:			
Company: Ecology & Environment, Inc			
Address: 33 N. Dearborn St.			
Suite 900, Chicago 60602			
Contact: Tim Calloway	Phone: 312-578-9243	Fax: 312-578-9345	Pager:
Contact:	Phone:	Fax:	Pager:
Project Number and/or P.O. #: KJ05			
Project Description/Location: 505-005-801			

INVOICE TO: (IF DIFFERENT)

Vince

ASBESTOS LABORATORY HOURS: Weekdays: 6 am - 9 pm
Weekends: 8 am - 5 pm

Prior Notice REQUIRED for weekend PLM turnaround

PCM/PLM ___ 2 Hour RUSH ___ 24 hour X 3-5 weekdays

Prior Notice REQUIRED for TEM 6 Hour RUSH

TEM ___ 6 Hour RUSH ___ 24 hour ___ 3-5 weekdays

3-5 weekday turnaround subject to lab volume, we will notify you if delays are expected.

Additional fees may apply for TEM analysis after laboratory hours or PLM analysis on weekends. Samples will be analyzed during laboratory hours unless after-hours service is authorized.

METALS LABORATORY HOURS: Weekdays: 8 am - 5 pm

AA ___ SPECIAL RUSH ___ 24 Hour ___ 3-5 Day

RCRA 8 ___ SPECIAL RUSH ___ 5 Day ___ 10 Day

TCLP ___ SPECIAL RUSH ___ 5 Day ___ 10 Day

Prior Notice REQUIRED for SPECIAL RUSH AA, RCRA or TCLP
RCRA and TCLP SPECIAL RUSH is 3 Day Turnaround

ANALYTICAL METHOD

AIR
- [ ] PCM 7400A, 7400B, OSHA
- [ ] TEM AHERA, Level II, 7402, +/-
- [ ] SEM
- [ ] XRD Total, Respirable
- [ ] AA / ICP ___ Metal ___ RCRA 8
- [ ] Dust Total, Respirable

BULK: misc
- [x] PLM Short report, Long report, Point Count
- [ ] TEM +/-, Quant, Semi-quant
- [ ] SEM +/-
- [ ] XRD Quartz, Other ___
- [ ] AA / ICP ___ Metal ___ RCRA 8

Paint, Soil, Dust, Wipe, TCLP

WATER
- [ ] TEM Drinking, Waste Water
- [ ] AA Water ___ Metal ___ RCRA 8

Drinking, Waste Water

OTHER [ ] Specify ___

	Client Sample Number	Volume	EM #
1.	BS-5-WMIN		484374
2.	BS-6-WMIN		75
3.	OS-8- ↓		76
4.	OS-1-SS		77
5.	OS-8-WMIN - Not on orig Coc.		78
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14.			
15.			

Number of samples received: 5 (Use as many additional sheets as needed.)

NOTE: If the package has sustained substantial damage or the custody seal is broken, stop and contact project manager and shipper. RESI will analyze incoming samples based upon information received with those samples. RESI is not responsible for errors or omissions in calculations resulting from the inaccuracy of original data. Turnaround times are based upon times of receipt by Laboratory. Call Laboratory for number of samples guaranteed in short turnaround.

Relinquished By: ___ Date/Time: ___

Received By: [illegible] 5/14/02 [illegible]

Condition of package/delivery upon receipt: ___

RESULTS: Contact: ___ Page: ___ Phone: ___

SPLITS: Authorization By/Time: ___

Analytical Method/Turnaround: ___

rev 9/1/99 Results Due: ___ Results Out: ___

FedEx USA Airbill FedEx Tracking Number 810252086803

Form I.D. No. 0200

1 From

Date 5/16/00 [redacted]

Sender's Name n. Calloway Phone (312) 578-9243

Company Ecology & Environment, Inc.

Address 33 N. Dearborn St. Suite-900 Dept./Floor/Suite/Room

City Chicago. State IL. ZIP 60602

2 Your Internal Billing Reference Information KJ05/0F1401SIXX-24

3 To

Recipient's Name Jeanne Orr Phone (303) 830-1986.

Company Reservoir Environmental Services

Address 1827 Grant St. Dept./Floor/Suite/Room

☐ Check here if residence (Extra charge applies for FedEx Express Saver)

(To "HOLD" at FedEx location, print FedEx address here)

City Denver State CO ZIP 80203

For HOLD at FedEx Location check here

☐ Hold Weekday (Not available with FedEx First Overnight)

☐ Hold Saturday (Not available at all locations) (Available for FedEx Priority Overnight and FedEx 2Day only)

☐ Saturday Delivery (Available for FedEx Priority Overnight and FedEx 2Day only) (Extra Charge. Not available at all locations)

☐ NEW Sunday Delivery (Available for FedEx Priority Overnight only)

810252086803

Res 64244

4a Express Package Service *Packages under 150 lbs.*

☒ FedEx Priority Overnight (Next business morning)

☐ FedEx Standard Overnight (Next business afternoon)

☐ FedEx First Overnight (Earliest next business morning delivery to select locations)

☐ FedEx 2Day (Second business day)

☐ FedEx Express Saver (Third business day)

FedEx Letter Rate not available. Minimum charge: One pound rate.

4b Express Freight Service *Packages over 150 lbs.*

☐ FedEx Overnight Freight (Next business day)

☐ FedEx 2Day Freight (Second business day)

☐ FedEx Express Saver Freight (Up to 3 business days)

(Call for delivery schedule. See back for detailed descriptions of freight services.)

5 Packaging

☐ FedEx Letter (Declared value limit $500) ☐ FedEx Pak ☐ FedEx Box ☐ FedEx Tube ☒ Other Pkg.

6 Special Handling

Does this shipment contain dangerous goods? (One box must be checked)

☒ No ☐ Yes As per attached Shipper's Declaration ☐ Yes Shipper's Declaration not required

☐ Dry Ice Dry Ice, 9, UN 1845 ___ x ___ kg

☐ Cargo Aircraft Only

*Dangerous Goods cannot be shipped in FedEx packaging.

7 Payment

Bill to: ☒ Sender (Account No. in Section 1 will be billed) ☐ Recipient ☐ Third Party ☐ Credit Card ☐ Cash/Check

(Enter FedEx Account No. or Credit Card No. below)

[redacted]

Total Packages	Total Weight	Total Declared Value	Total Charges
1	11	$ 500.00	$

When declaring a value higher than $100 per shipment, you pay an additional charge. See SERVICE CONDITIONS, DECLARED VALUE, AND LIMIT OF LIABILITY section for further information.

Credit Card Auth.

8 Release Signature

Your signature authorizes Federal Express to deliver this shipment without obtaining a signature and agrees to indemnify and hold harmless Federal Express from any resulting claims.

Questions?

Call 1·800·Go·FedEx® (800)463-3339

321

ecology and environment, inc.
International Specialists in the Environment

33 North Dearborn Street
Chicago, Illinois 60602
Tel. 312/578-9243, Fax: 312/578-9345

M E M O R A N D U M

DATE: July 14, 2000

TO: Vincent Gee, START Project Manager, E & E, Chicago, Illinois

FROM: David Hendren, START Analytical Services Manager, E & E, Chicago, Illinois

THROUGH: Patrick Zwilling, START Assistant Program Manager, E & E, Chicago, Illinois

SUBJECT: Data Quality Review for Asbestos, Western Mineral Processing, Minneapolis, Hennepin County, Minnesota

REFERENCE: Project TDD S05-0006-010 Analytical TDD S05-0005-805
Project PAN 0N1001RSXX Analytical PAN 0YAE01TAXX

The data quality assurance (QA) review of 29 soil samples collected from the Western Mineral Processing site is complete. The samples were collected on June 21 and 22, 2000, by the Superfund Technical Assessment and Response Team (START) contractor, Ecology and Environment, Inc. (E & E). The samples were submitted to Reservoirs Environmental Services, Inc., Denver, Colorado. The laboratory analyses were performed according to the United States Environmental Protection Agency (U.S. EPA) Method 600/R-93/116 for analysis using polarized light microscopy (PLM) and by transmission electron microscopy (TEM).

Sample Identification

START Identification No.	Laboratory Identification No.
EP-1S	EM 492500
EP-2S	EM 492501
EP-3S	EM 492502
EP-4S	EM 492503
EP-5S1	EM 492504
EP-6S2	EM 492505
EP-7S2	EM 492506
T-1S	EM 492507
T-2S	EM 492508
P-1S	EM 492509
P-2S	EM 492510

START Identification No.	Laboratory Identification No.
P-2SD	EM 492511
E-1S	EM 492512
E-2S	EM 492513
E-3S	EM 492514
E-4S	EM 49S515
E-5S	EM 492516
E-6S	EM 492517
E-7S	EM 492518
E-8S	EM 492519
RES-1	EM 492520
RES-2	EM 492521
RES-3	EM 492522
RES-4	EM 492523
RES-5	EM 492524
RES-6	EM 492525
RES-21	EM 492526
RES-31	EM 492527
RES-41	EM 492528

Data Qualifications:

I. Sample Holding Time: Acceptable

The samples were collected on June 21 and 22, 2000, and analyzed on July 12 and 13, 2000. The Office of Solid Waste and Emergency Response (OSWER) Directive 9360.4-01 (April 1990) does not specify holding times for these parameters.

II. Overall Assessment of Data for Use: Acceptable

The overall usefulness of the data is based on criteria for QA Level II as outlined in OSWER Data Validation Procedures, Section 9.0, Generic Data Validation Procedures. Based upon the information provided, the data are acceptable for use.

NVLAP LAB NO. 101896

ASBESTOS - TEM, PCM, PLM, S
METALS - AA, FLAME/FURNACE
AIRBORNE PARTICULATES
SPECIAL PARTICLE ANALYSIS

A LAB I.D. 101533

RESERVOIRS ENVIRONMENTAL SERVICES, INC.

1827 GRANT STREET DENVER, COLORADO 80203-1107 (800) 678-7374 (303) 830-1986 FAX (303) 863-9196

July 14, 2000

Mr. Vincent Gee
Ecology & Environment, Inc.
33 N. Dearborn Street
Suite 900
Chicago, IL 60602

RE: RES Job No. 70398-1 - KJ05, S05-0005-805 - Bulk Samples: EP-1S, EP-2S, EP-3S, EP-4S, EP-5S1, EP-6S2, EP-7S2, T1S, T2S, P1S, P2S, P2SA, E1S, E2S, E3S, E4S, E5S, E6S, E7S, E8S, RES1, RES2, RES3, RES4, RES5, RES6, RES2I, RES3I and RES4I.

Dear Mr. Lee:

Reservoirs Environmental Services, Inc. (RES, Inc.) has analyzed 29 bulk material samples by Polarized Light Microscopy (PLM) for asbestos content as per your request. The samples were received on June 27, 2000, and initial results were telephoned to your office within five days of receipt. PLM was used to analyze the bulk materials in compliance with guidelines established by the USEPA (EPA/600/R-93/116). The Analytical Results are presented in Table I.

RES, Inc. has assigned job number RES 70398-1 to this study. This report is considered highly confidential and the sole property of Ecology & Environment, Inc. RES, Inc. will not discuss any part of this study with personnel other than those of the client. The results described in this report only apply to the samples analyzed. Samples will be disposed of after sixty days unless longer storage is requested. The US EPA guideline was developed for use on friable building materials and recommends the use of additional analyses for non-friable materials such as floor tiles. RES, Inc. recommends additional analyses to confirm negative PLM results on floor tiles. This report is not to be reproduced, except in full, without specific written approval by RESI. This report must not be used to claim endorsement of products or analytical results by NVLAP or any agency of the U.S. Government.

Only the PLM microscopy results contained in this report are subject to NVLAP accreditation, other information presented is not NVLAP accredited.

If you should have any questions about this report, please feel free to call me at 830-1986.

Sincerely,

Jeann Spencer Orr
President

PDA/sk

Analyst(s):
Brett S. Colbert
Paul F. Knappe
Paul D. Lo Scalzo
Liu Wenlong

TABLE I. PLM BULK ANALYSIS, PERCENTAGE COMPOSITION BY VOLUME

RES Job Number: RES 70398-1
Client: Ecology & Environment, Inc.
Client Project: KJ05, S05-0005-805
Date Samples Received: June 27, 2000
Analysis Type: Miscellaneous PLM, Bulk
Turnaround: 3-5 Day

Client Sample Number	Lab ID Number	Layer	Physical Description	Portion of Total Sample (%)	ASBESTOS CONTENT BY LAYER Mineral	Visual Estimate (%)	Non-Asbestos Fibrous Components (%)	Non-Fibrous Components (%)
EP-1S	EM 492500	A	Brown soil	100	Trem-Act	TR	TR	100
EP-2S	EM 492501	A	Brown soil	100	Trem-Act	TR	TR	100
EP-3S	EM 492502	A	Brown soil	100	Trem-Act	TR	3	97
EP-4S	EM 492503	A	Brown soil	100	Trem-Act	1	TR	99
EP-5SI	EM 492504	A	Brown mica	100	Trem-Act	3	TR	97
EP-6S2	EM 492505	A	Brown soil	100	Trem-Act	6	4	90
EP-7S2	EM 492506	A	Brown soil	100	Trem-Act	1	1	98
T-1S	EM 492507	A	Brown mica	100	Trem-Act	12	5	83
T-2S	EM 492508	A	Brown soil	100	Trem-Act	8	5	87
P-1S	EM 492509	A	Brown soil	100	Trem-Act	5	4	91
P-2S	EM 492510	A	Brown mica	100	Trem-Act	4	1	95
P-2SD	EM 492511	A	Brown mica	100	Trem-Act	2	2	96

ND = None Detected
TR = Trace, < 1% Visual Estimate
Trem-Act = Tremolite-Actinolite
Point Count Trace = Observed but not countable under protocol, < 0.25%
Analyst: PDL/PFK
Data QA

RESERVOIRS ENVIRONMENTAL SERVICES, INC.

NVLAP Accredited Laboratory #1896 TDH 30-0136

TABLE I. PLM BULK ANALYSIS, PERCENTAGE COMPOSITION BY VOLUME

RES Job Number: **RES 70398-1**
Client: **Ecology & Environment, Inc.**
Client Project: **KJ05, S05-0005-805**
Date Samples Received: **June 27, 2000**
Analysis Type: **Miscellaneous PLM, Bulk**
Turnaround: **3-5 Day**

Client Sample Number	Lab ID Number	Layer	Physical Description	Portion of Total Sample (%)	ASBESTOS CONTENT BY LAYER Mineral	Visual Estimate (%)	Non-Asbestos Fibrous Components (%)	Non-Fibrous Components (%)
E 1S	EM 492512	A	Brown soil	100	Trem-Act	4	TR	96
E 2S	EM 492513	A	Brown soil	100	Trem-Act	TR	TR	100
E-3S	EM 492514	A	Brown soil	100		ND	2	98
E 4S	EM 492515	A	Brown soil	100	Trem-Act	2	TR	98
E 5S	EM 492516	A	Tan mica	100	Trem-Act	10	TR	90
E 6S	EM 492517	A	Brown soil	100	Trem-Act	5	3	92
E-7S	EM 492518	A	Brown soil	100	Trem-Act	4	1	95
E-8S	EM 492519	A	Brown soil	100		ND	1	99
Res 1	EM 492520	A	Brown soil	100	Trem-Act	TR	15	85
Res 2	EM 492521	A	Brown soil	100	Trem-Act	TR	2	98
Res 3	EM 492522	A	Brown soil	100	Trem-Act	10	TR	90
Res-4	EM 492523	A	Brown soil	100	Trem-Act	6	TR	94

ND None Detected
TR Trace, < 1% Visual Estimate

Trem-Act = Tremolite-Actinolite
Point Count Trace = Observed but not countable under protocol, < 0.25%

Data QA

RESERVOIRS ENVIRONMENTAL SERVICES, INC.

NVLAP Accredited Laboratory #1896 **TDH 30-0136**

TABLE I. PLM BULK ANALYSIS, PERCENTAGE COMPOSITION BY VOLUME

RES Job Number:	**RES 70398-1**
Client:	**Ecology & Environment, Inc.**
Client Project:	**KJ05, S05-0005-805**
Date Samples Received:	**June 27, 2000**
Analysis Type:	**Miscellaneous PLM, Bulk**
Turnaround:	**3-5 Day**

Client Sample Number	Lab ID Number	Layer	Physical Description	Portion of Total Sample (%)	ASBESTOS CONTENT BY LAYER Mineral	Visual Estimate (%)	Non-Asbestos Fibrous Components (%)	Non-Fibrous Components (%)
Res 5	EM 492524	A	Brown soil	100	Trem Act	6	TR	94
Res 6	EM 492525	A	Brown soil	100	Trem Act	4	TR	96
Res 21	EM 492526	A	Brown/green mineral fragments	100	Trem Act	70		30
Res 31	EM 492527	A	Brown/green mineral fragments	100	Trem-Act	80		20
Res 41	EM 492528	A	Brown/green mineral fragments	100	Trem-Act	65	10	25

ND = None Detected
TR = Trace, < 1% Visual Estimate
Trem-Act = Tremolite-Actinolite
Point Count Trace = Observed but not countable under protocol, < 0.25%

Data QA

ecology and environment, inc.
International Specialists in the Environment

33 North Dearborn Street
Chicago, Illinois 60602
Tel. 312/578-9243, Fax: 312/578-9345

M E M O R A N D U M

DATE: July 14, 2000

TO: Vincent Gee, START Project Manager, E & E, Chicago, Illinois

FROM: David Hendren, START Analytical Services Manager, E & E, Chicago, Illinois

THROUGH: Patrick Swilling, START Assistant Program Manager, E & E, Chicago, Illinois

SUBJECT: Data Quality Review for Asbestos, Western Mineral Processing, Minneapolis, Hennepin County, Minnesota

REFERENCE: Project TDD S05-0002-014 Analytical TDD S05-0005-805
Project PAN 0F1401SIXX Analytical PAN 0YAE01TAXX

The data quality assurance (QA) review of five solid samples collected from the Western Mineral Processing site is complete. The samples were collected on April 13, 2000, by the Superfund Technical Assessment and Response Team (START) contractor, Ecology and Environment, Inc. (E & E). The samples were submitted to Reservoirs Environmental Services, Inc., Denver, Colorado. The laboratory analyses were performed according to the United States Environmental Protection Agency (U.S. EPA) Method 600/R-93/116 for analysis using polarized light microscopy (PLM) and by transmission electron microscopy (TEM).

Sample Identification

START Identification No.	Laboratory Identification No.
BS-5-WMIN	EM 484374
BS-6-WMIN	EM 484375
OS-8-WMIN	EM 484376
OS-1-SS	EM 484377
OS-7	EM 488970

Data Qualifications:

I. Sample Holding Time: Acceptable

The samples were collected on April 13, 2000, and analyzed on June 14, 2000. The Office of Solid Waste and Emergency Response (OSWER) Directive 9360.4-01 (April 1990) does not specify holding times for these parameters.

II. Overall Assessment of Data for Use: Acceptable

The overall usefulness of the data is based on criteria for QA Level II as outlined in OSWER Data Validation Procedures, Section 9.0, Generic Data Validation Procedures. Based upon the information provided, the data are acceptable for use.

NVLAP LAB NO. 101896

ASBESTOS - TEM, PCM, PLM, SEM
METALS - AA, FLAME/FURNACE
AIRBORNE PARTICULATES
SPECIAL PARTICLE ANALYSIS

LAB I.D. 101533

RESERVOIRS ENVIRONMENTAL SERVICES, INC.

1827 GRANT STREET DENVER, COLORADO [illegible] (800) 878-7374 (303) 830-1966 FAX (303) 863-9196

July 6, 2000

Mr. Timothy Calloway
Ecology & Environment, Inc.
33 N. Dearborn Street
Suite 900
Chicago, IL 60602

RE: RES Job No. 69244-1 – KJO5, S05-005-805 – Bulk Samples: BS-5-WMIN, BS-6-WMIN, OS-6-WMIN and OS-1-SS. Sample Received but not Analyzed: OS-8-WMIN.

Dear Mr. Calloway:

Reservoirs Environmental Services, Inc. (RES, Inc.) has analyzed four bulk material samples by Polarized Light Microscopy (PLM) followed by Transmission Electron Microscopy (TEM) and Energy Dispersive X-ray Spectrometry (EDX) to confirm the type of asbestos mineral present. The samples were received on May 17, 2000 and initial PLM results were telephoned to your office within five days of receipt.

PLM was used to analyze the bulk material samples in compliance with guidelines established by the USEPA (EPA/600/R-93/116). Amphibole asbestos was found in each of the four samples analyzed. Samples BS-5-WMIN and BS-6-WMIN were tan processed vermiculite samples. The fibers were small and difficult to find. No difference was noted between these two samples. Sample OS-6-WMIN was a brown soil sample with relatively large pieces of amphibole asbestos mixed in the soil. Sample OS-1-SS was a brown unprocessed mica sample with silver paint chips. Chrysotile asbestos was found in the silver paint. The PLM results are presented in Table I.

TEM/EDX revealed amphibole fibers in each of the four samples analyzed. An estimation of concentration was not made during the TEM analysis although the fibers were frequent and easy to find in each sample preparation. The fibers varied slightly in elemental composition but were generally in the Tremolite –

Actinolite solid solution series. A sodium peak was present in many of the fibers. Sodium combined with a smaller Calcium peak is consistent with the mineral Ricterite found in the some vermiculite deposits. A minor Potassium peak was also present in many of the fibers. Characteristic X-ray spectra are in Attachment I. Electron micrographs of the fibers are in Attachment II.

RES. Inc. has assigned job number RES 69244-1 to this study. This report is considered highly confidential and the sole property of Ecology & Environment, Inc. RES, Inc. will not discuss any part of this study with personnel other than those of the client. The results described in this report only apply to the samples analyzed. Samples will be disposed of after sixty days unless longer storage is requested. This report must not be used to claim endorsement of products or analytical results by NVLAP or any agency of the U.S. Endorsement. Only the PLM results contained in this report are subject to NVLAP accreditation, other information presented is not NVLAP accredited.

If you should have any questions about this report. Please feel free to call me at (303) 830-1986.

Sincerely,

Jeanne Spencer Orr
President

PLM Analyst, Paul D. LoScalzo

RESERVOIRS ENVIRONMENTAL SERVICES, INC.

NVLAP Accredited Laboratory #1896 TDH 30-0136

TABLE I. PLM BULK ANALYSIS, PERCENTAGE COMPOSITION BY VOLUME

RES Job Number: **RES 69244-1**
Client: **Ecology & Environment, Inc.**
Client Project: **KJ05, S05 005-805**
Date Samples Received: **May 17, 2000**
Analysis Type: **Miscellaneous PLM, Bulk**
Turnaround: **3 5 Day**

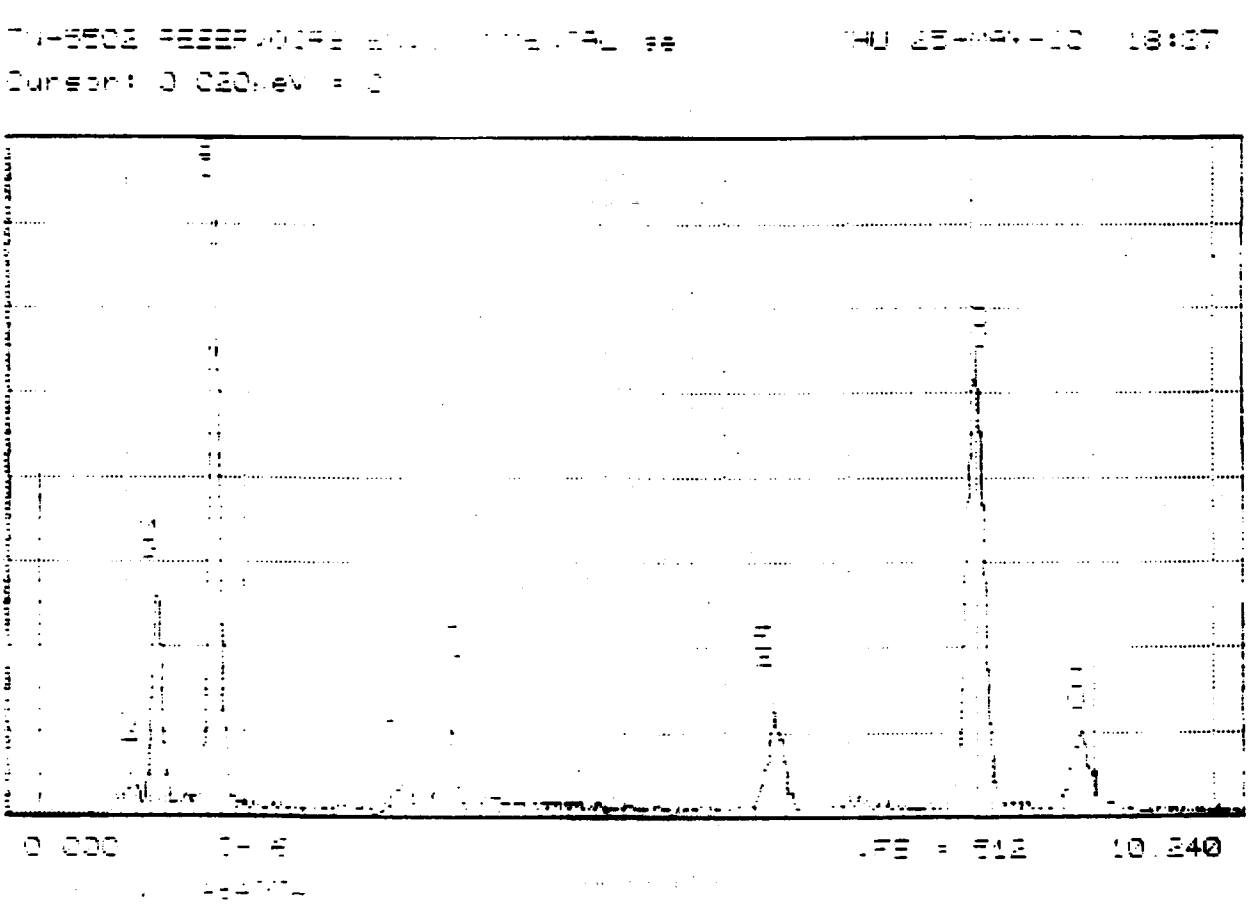
Client Sample Number	Lab ID Number	Layer	Physical Description	Portion of Total Sample (%)	ASBESTOS CONTENT BY LAYER Mineral	Visual Estimate (%)	Non Asbestos Fibrous Components (%)	Non Fibrous Components (%)
BS-5 WMIN	EM 484374	A	Tan vermiculite	100	**Trem-Act**	TR	0	100
BS 6 WMIN	EM 484375	A	Tan vermiculite	100	**Trem Act**	TR	0	100
OS 8 WMIN	EM 484376	A	Brown soil	100	**Trem Act**	8	2	90
OS 1 SS	EM 484377	A	Brown micaceous material	100	**Chrysotile** **Trem-Act**	2 TR	5	93
OS 8 WMIN	EM 484378		Not Analyzed					

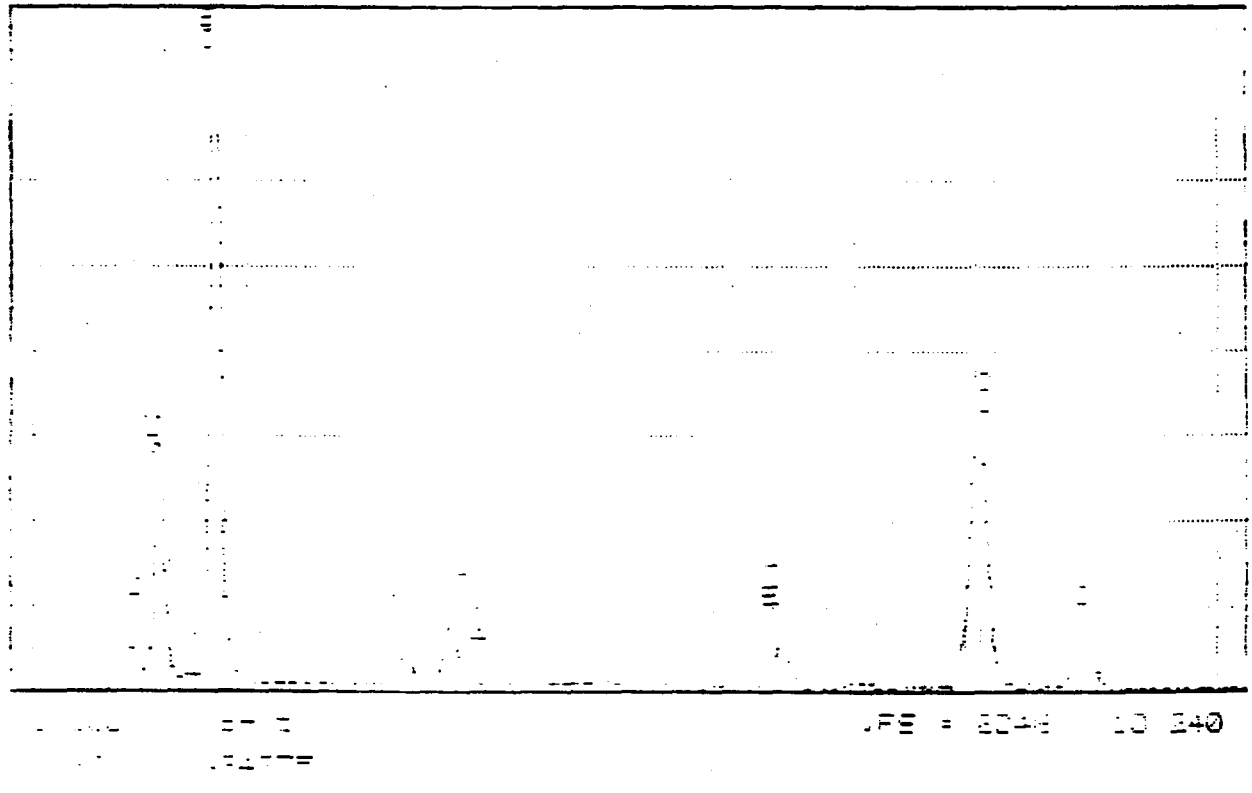
ND None Detected
TR = Trace, < 1% Visual Estimate
Trem-Act = Tremolite-Actinolite
Point Count Trace = Observed but not countable under protocol, < 0.25%
Analyst: PDL

Data QA

ATTACHMENT I

Energy Dispersive X-Ray Spectra





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[illegible]	[illegible]
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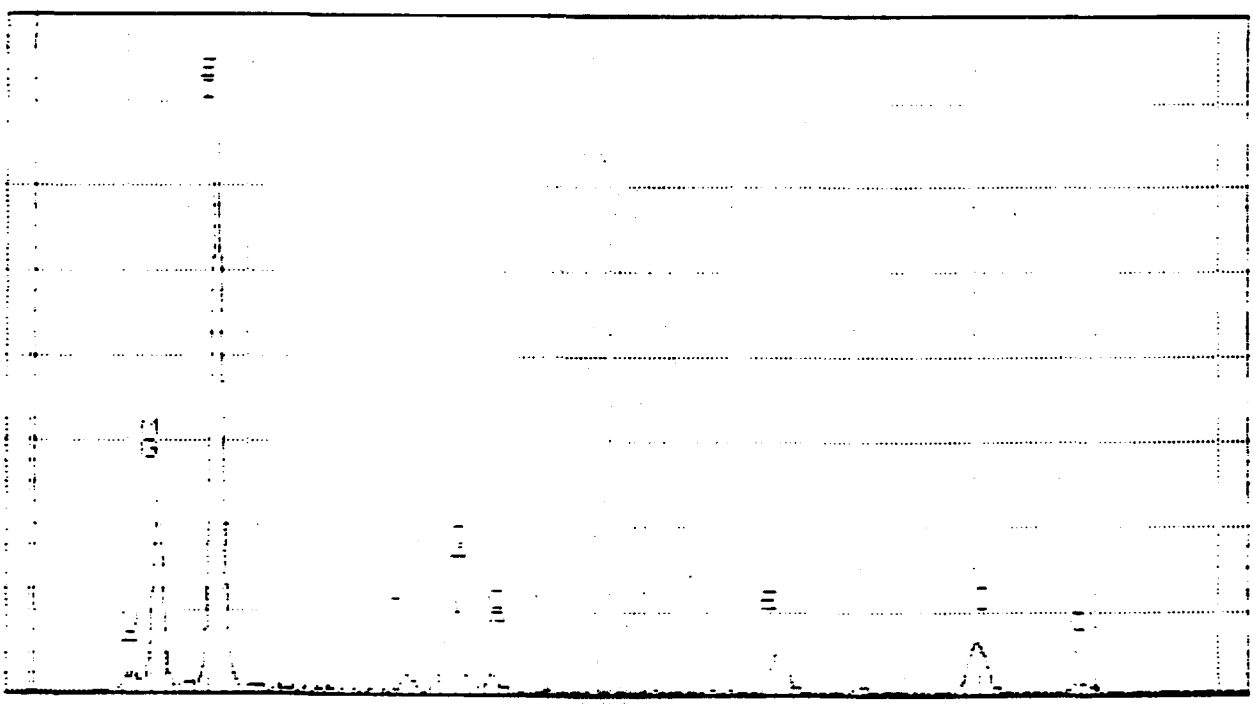

0.000 [illegible]   FS = 1024   10.240

ATTACHMENT II

Electron Micrographs

Figure 1: Electron micrograph of vermiculite plates with amphibole fibers found in sample BS-5-WMIN. Magnification 5000X.

Figure 2: Electron Micrograph of vermiculite plates with amphibole fibers found in sample BS-6-WMIN. Magnification 5000X.

Figure 3: Amphibole fibers found in sample OS-8-WMIN. Magnification 10,000X.

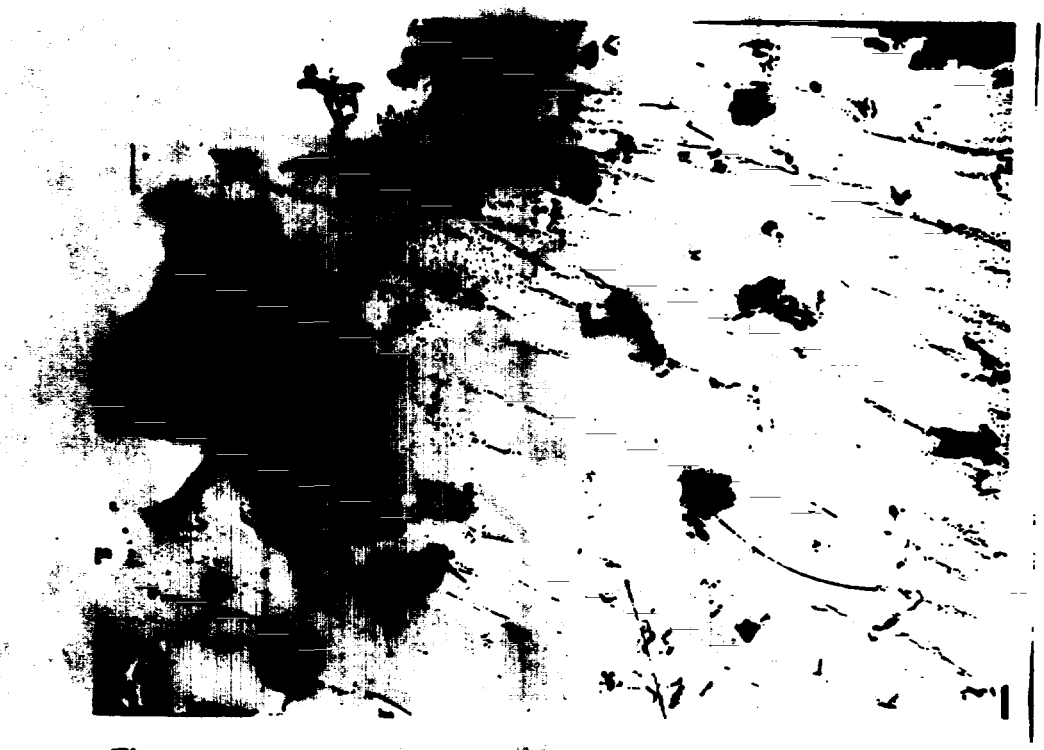

Figure 4: Electron Micrograph of mica plates with amphibole fibers and thin chrysotile fibers. Magnification 10,000X

ENVIRONMENTAL PROTECTION AGENCY
Office of Enforcement

N 5
77 West Jackson Boulevard
Chicago, Illinois 60604

CHAIN OF CUSTODY RECORD

PROJ. NO.	PROJECT NAME
KJ05	s S05-005-805

SAMPLERS: *(Print Name and Sign)*
Eric Reuscher

Activity Code:

STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	Analysis: ASBESTOS	TAG NUMBERS
~~BS-5-MIN~~	4/13	0945		X	Above Drop Ceiling	1/ 8oz	X	Turnaround Time 7 day Verbal
~~BS-6-MIN~~	4/13	0945		X	" " "	1/ 8oz	X	" " 14 day Hardcopy
~~OS-8-MIN~~	4/13	0950		X	From North side of Building	2/ 8oz	X	
OS-1-SS	4/13	1100		X	R/R Spur behind Building (Harding)	1/ 8oz	X	

Send Results to: Dave Hendren
Ecology & Environment, Inc.
33 N. Dearborn St. Suite-900
Chicago, IL. 60602 Ph#(312)578-9243
Fax#(312)578-9345

Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*
		Timothy Calloway
Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*
Relinquished by: *(Signature)*	Date / Time	Received for Laboratory by: *(Signature)* / Date / Time
Timothy Calloway	5/16/00 1105	S. Kahl 5/17/00 9:50am

Ship To: Reservoir Environmental Services
1827 Grant St.
Denver, CO. 80203
(303)830-1986
ATTN: Jeanne Orr

Airbill Number
810252086803

Chain of Custody Seal Numbers
25565

Distribution: White - Accompanies Shipment; Pink - Coordinator Field Files; Yellow - Laboratory File

Page ___ of ___

RESERVOIRS ENVIRONMENTAL SERVICES, INC.

1827 GRANT STREET
DENVER, CO 80203

Phone (303) 832-1950 Fax (303) 863-9196 WATS 1-800-678-7374
PAGER 509-0964 509-4125 and 509-5406 AFTER HOURS USE ONLY

RESI Job #: RES 69244
Due Date: 5/23/02
Due Time: 9:30am

SAMPLES SUBMITTED BY:
Ecology & Environment, Inc
33 N Dearborn St.
Suite 900, Chicago 60602
Contact: Tim Calloway Phone: 312-578-9243 Fax: 312-575-9345 Pager:

Contact: Phone Fax Pager:

INVOICE TO: (IF DIFFERENT)

Project Number and/or P.O. #: RJ05
Project Description/Location: 505-005-801

ASBESTOS LABORATORY HOURS: Weekdays: 6 am - 9 pm; Weekends: 8 am - 5 pm

Prior Notice REQUIRED for weekend PLM turnaround

PCM/PLM ___ 2 Hour RUSH ___ 24 hour X 3-5 weekdays

Prior Notice REQUIRED for TEM 6 Hour RUSH

TEM ___ 6 Hour RUSH ___ 24 hour ___ 3-5 weekdays

3-5 weekday turnaround subject to lab volume, we will notify you if delays are expected

Additional fees may apply for TEM analysis after laboratory hours or PLM analysis on weekends. Samples will be analyzed during laboratory hours unless after-hours service is authorized

METALS LABORATORY HOURS: Weekdays 8 am - 5 pm

AA ___ SPECIAL RUSH ___ 24 Hour ___ 3-5 Day

RCRA 8 ___ SPECIAL RUSH ___ 5 Day ___ 10 Day

TCLP ___ SPECIAL RUSH ___ 5 Day ___ 10 Day

Prior Notice REQUIRED for SPECIAL RUSH AA RCRA or TCLP
RCRA and TCLP SPECIAL RUSH is 3 Day Turnaround

ANALYTICAL METHOD

AIR [ ] PCM 7400A, 7400B, OSHA
[ ] TEM AHERA, Level II, 7402, +/-
[ ] SEM
[ ] XRD Total, Respirable
[ ] AA / ICP ___ Metal ___ RCRA 8
[ ] Dust Total, Respirable

BULK: [✓] PLM Short report, Long report, Point Count
Misc [ ] TEM +/-, Quant, Semi-quant
[ ] SEM +/-
[ ] XRD Quartz, Other ___
[ ] AA / ICP ___ Metal ___ RCRA 8
Paint, Soil, Dust, Wipe, TCLP

WATER [ ] TEM Drinking, Waste Water
[ ] AA Water ___ Metal ___ RCRA 8
Drinking, Waste Water

OTHER [ ] Specify ___

Special Instructions:

	Client Sample Number	Volume	EM #
1.	BS-5-WMIN		484374
2.	BS-6-WMIN		75
3.	OS-8- ↓		76
4.	OS-1-SS		77
5.	OS-8-WMIN - Not on C.O.C.		78
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14.			
15.			

Number of samples received: 5 (Use as many additional sheets as needed.)

NOTE: If the package has sustained substantial damage or the custody seal is broken, stop and contact project manager and shipper. RESI will analyze incoming samples based upon information received with those samples. RESI is not responsible for errors or omissions in calculations resulting from the inaccuracy of original data. Turnaround times are based upon times of receipt by Laboratory. Call Laboratory for number of samples guaranteed in short turnaround

Relinquished By: Date/Time:

Laboratory Use Only
Received By:
Carrier: Condition of package/custody seal:

RESULTS: Contact Page Phone Fax Initials

SPLITS: Authorization By/Time:
Analytical Method/Turnaround:
Results Due: Results Out:

rev 9/1/99

FedEx USA Airbill — FedEx Tracking Number 810252086803 — 0200

From
5/16/00 [redacted]

m. Calloway — Phone (312) 578-9243

Ecology & Environment, Inc.

33 N. Dearborn St. — Suite 900 — Dept/Floor/Suite/Room

Chicago, State IL ZIP 60602

Your Internal Billing Reference Information KJ05/0F1401SIXX-24

To

Recipient's Name Jeanne Orr — Phone (303) 830-1986

Company Reservoir Environmental Services

Address 1827 Grant St. — Check here if residence

To "HOLD" at FedEx location, print FedEx address here — Dept/Floor/Suite/Room

Denver State CO ZIP 80203

For HOLD at FedEx Location check here: Hold Weekday / Hold Saturday

For WEEKEND Delivery: Saturday Delivery / NEW Sunday Delivery

8 1 0 2 5 2 0 8 6 8 0 3

Res 6934

4a Express Package Service — Packages under 150 lbs.
FedEx Priority Overnight / FedEx Standard Overnight / FedEx First Overnight / FedEx 2Day / FedEx Express Saver

4b Express Freight Service — Packages over 150 lbs.
FedEx Overnight Freight / FedEx 2Day Freight / FedEx Express Saver Freight
(Call for delivery schedule. See back for detailed descriptions of freight services.)

5 Packaging: FedEx Letter / FedEx Pak / FedEx Box / FedEx Tube / [X] Other Pkg.

6 Special Handling
Does this shipment contain dangerous goods? [X] No / Yes / Yes
Dry Ice — Dry Ice, 9, UN 1845 ___ x ___ kg
Cargo Aircraft Only

7 Payment
Bill to: [X] Sender / Recipient / Third Party / Credit Card / Cash/Check

[redacted]

Total Packages	Total Weight	Total Declared Value	Total Charges
1	11	$ 500.00	$

Credit Card Auth.

8 Release Signature

Your signature authorizes Federal Express to deliver this shipment without obtaining a signature and agrees to indemnify and hold harmless Federal Express from any resulting claims.

321

Questions?
Call 1·800·Go·FedEx® (800)463-3339

NVLAP LAB NO. 101896

ASBESTOS - TEM, PCM, PLM, SE
METALS - AA, FLAME/FURNACE
AIRBORNE PARTICULATES
SPECIAL PARTICLE ANALYSIS

LAB I.D. 101533

RESERVOIRS ENVIRONMENTAL SERVICES, INC.

1627 GRANT STREET DENVER, COLORADO 80203-1107 (800) 678-7374 (303) 830-1566 FAX (303) 863-0196

July 6. 2000

Mr. Dave Hendren
Ecology & Environment. Inc.
33 N. Dearborn Street
Suite 900
Chicago, IL 60602

RE: RES Job No. 69910-1 – SO5005-805 – Bulk Sample: OS-7.

Dear Mr. Calloway:

Reservoirs Environmental Services, Inc. (RES, Inc.) has analyzed one bulk material sample by Polarized Light Microscopy (PLM) followed by Transmission Electron Microscopy (TEM) and Energy Dispersive X-ray Spectrometry (EDX) to confirm the type of asbestos mineral present. The sample was received on June 9, 2000 and initial PLM results were telephoned to your office within five days of receipt.

PLM was used to analyze the bulk material sample in compliance with guidelines established by the USEPA (EPA/600/R-93/116). Amphibole asbestos was found in the sample. Sample OS-7 was brown mica and soil with relatively large pieces of amphibole asbestos mixed in the soil. The PLM results are presented in Table I.

TEM/EDX revealed abundant amphibole fibers. An estimation of concentration was not made during the TEM analysis. The fibers varied slightly in elemental composition but were generally in the Tremolite – Actinolite solid solution series. A sodium peak was present in many of the fibers. Sodium combined with a smaller Calcium peak is consistent with the mineral Ricterite found in the some vermiculite deposits. A minor Potassium peak was also present in many of the fibers. Characteristic X-ray spectra are in Attachment I. Electron micrographs of the fibers are in Attachment II.

RES. Inc. has assigned job number RES 69910-1 to this study. This report is considered highly confidential and the sole property of Ecology & Environment, Inc. RES, Inc. will not discuss any part of this study with personnel other than those of the client. The results described in this report only apply to the sample analyzed. Samples

will be disposed of after sixty days unless longer storage is requested. This report must not be used to claim endorsement of products or analytical results by NVLAP or any agency of the U.S. Endorsement. Only the PLM results contained in this report are subject to NVLAP accreditation. other information presented is not NVLAP accredited.

If you should have any questions about this report. Please feel free to call me at (303) 830-1986.

Sincerely,

Jeanne Spencer Orr
President

Paul D. LoScalzo

PLM Analyst, Paul D. LoScalzo

RESERVOIRS ENVIRONMENTAL SERVICES, INC.

NVLAP Accredited Laboratory #1896 TDH 30-0136

TABLE I. PLM BULK ANALYSIS, PERCENTAGE COMPOSITION BY VOLUME

RES Job Number: **RES 69910-1**
Client: **Ecology & Environment, Inc.**
Client Project: **S05-0005 805/KJ 05**
Date Samples Received: **June 9, 2000**
Analysis Type: **Miscellaneous PLM, Bulk**
Turnaround: **3-5 Day**

Client Sample Number	Lab ID Number	Layer	Physical Description	Portion of Total Sample (%)	ASBESTOS CONTENT BY LAYER Mineral	ASBESTOS CONTENT BY LAYER Visual Estimate (%)	Non-Asbestos Fibrous Components (%)	Non Fibrous Components (%)
OS-7	EM 488970	A	Brown mica	100	Trem-Act	20	TR	80

ND = None Detected
TR = Trace, < 1% Visual Estimate
Trem-Act = Tremolite-Actinolite
Point Count Trace = Observed but not countable under protocol, < 0.25%
Analyst: PDL
Data QA

ATTACHMENT I

Energy Dispersive X-Ray Spectra

N LAB

PEAK LISTING

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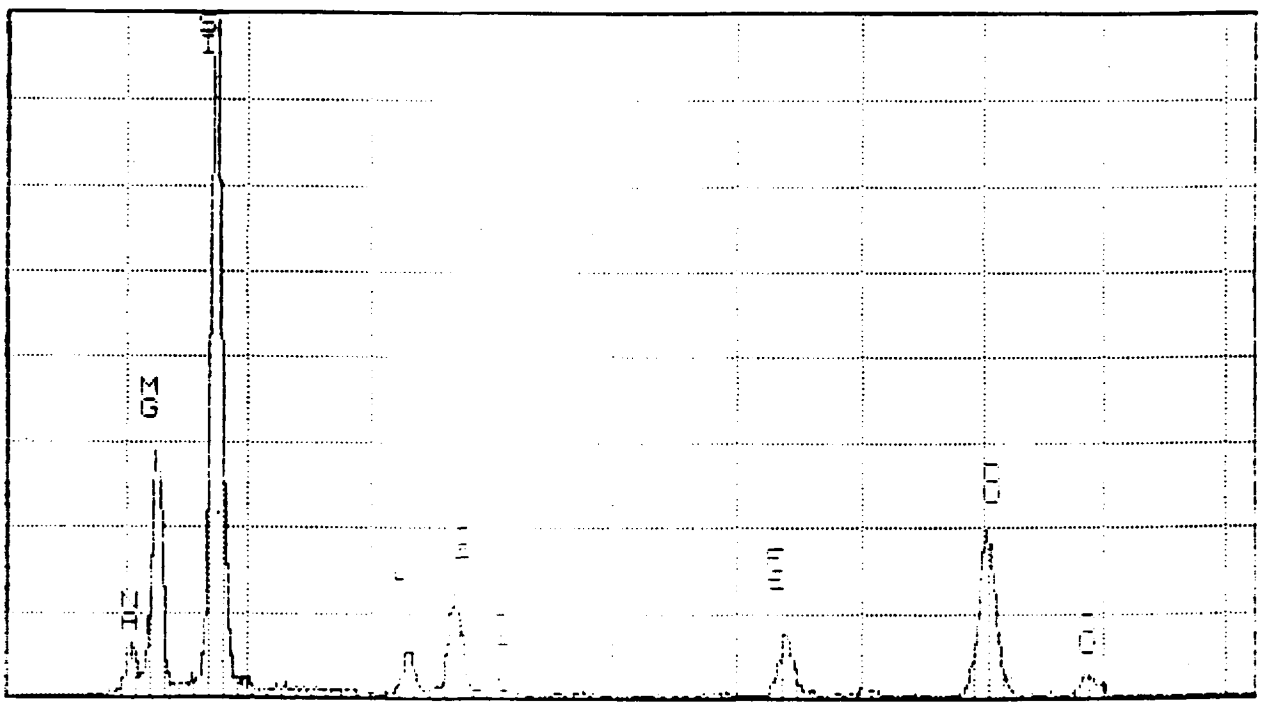

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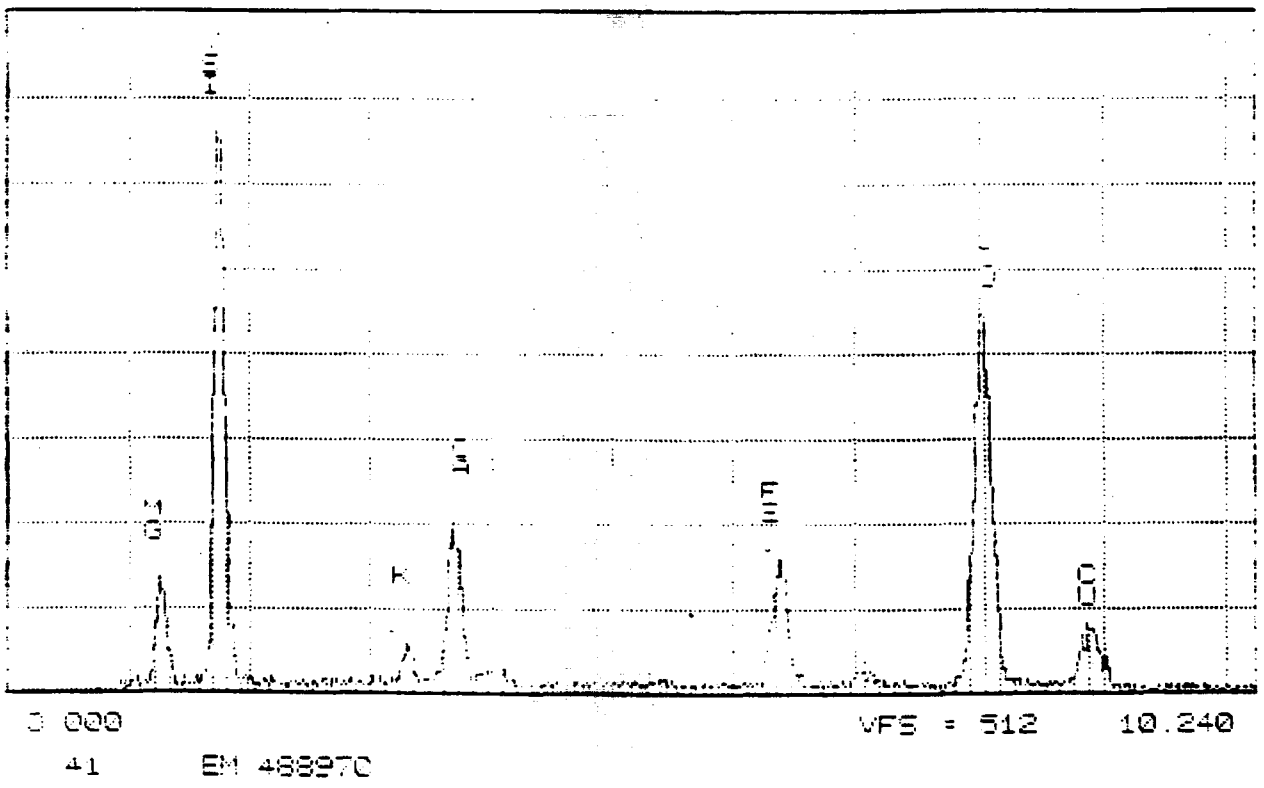
60 EM 488970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41
EM 488970

IN LAP

PEAK LISTING

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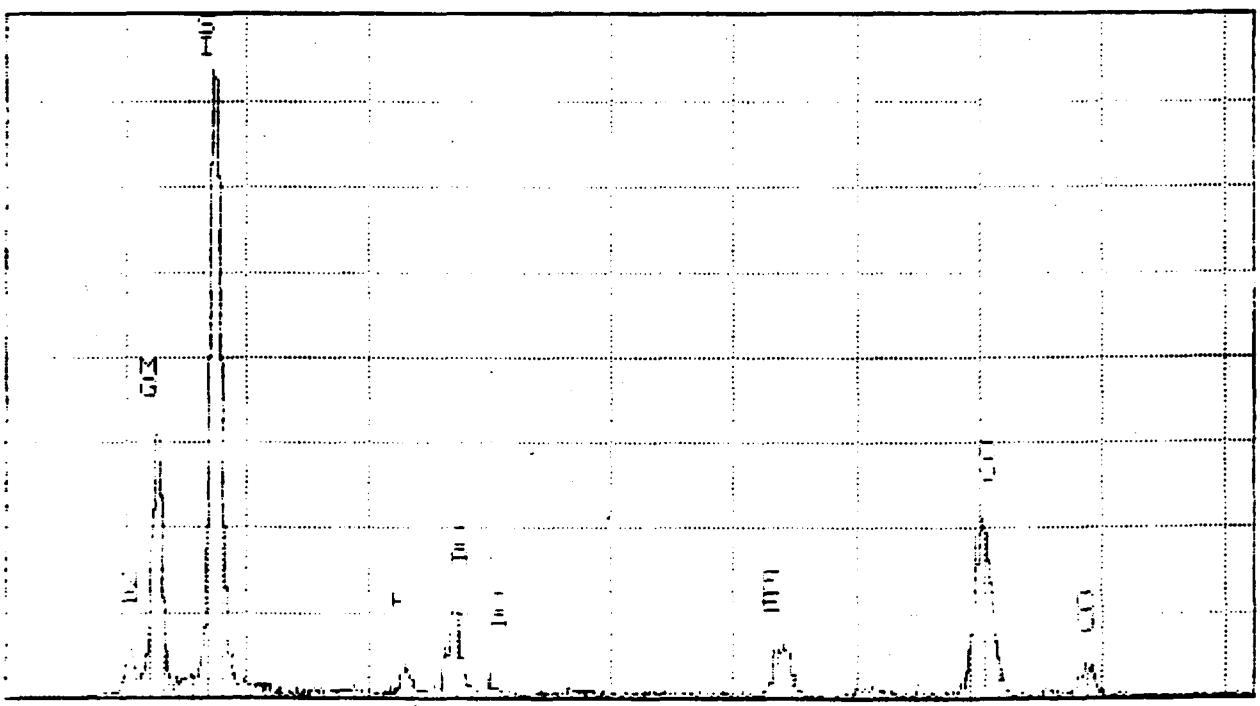

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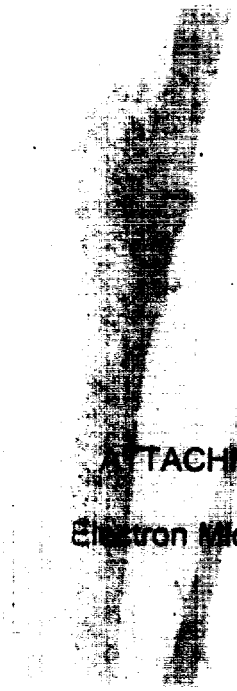
ATTACHMENT II

Electron Micrographs



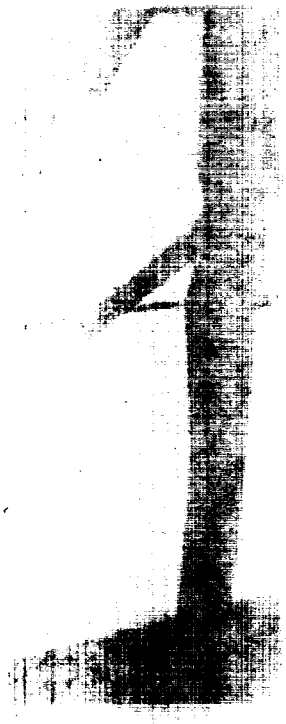


Figure 1: Electron micrograph of amphibole fibers found in sample OS-7. Magnification 10,000X.

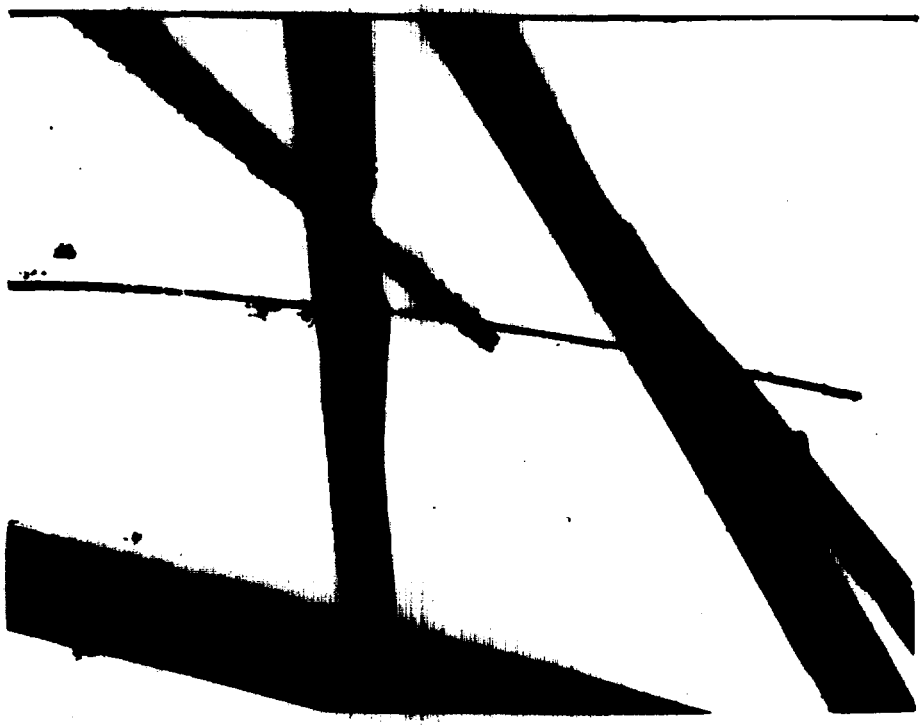


Figure 2: Electron Micrograph of amphibole fibers found in sample OS-7. Magnification 10,000X.

ecology and environment, inc.
International Specialists in the Environment

33 North Dearborn Street
Chicago, Illinois 60602
Tel. 312/578-9243, Fax: 312/578-9345

M E M O R A N D U M

DATE: September 7, 2000

TO: Vincent Gee, START Project Manager, E & E, Chicago, Illinois

FROM: David Hendren, START Analytical Services Manager, E & E, Chicago, Illinois

THROUGH: Patrick Zwilling, START Assistant Program Manager, E & E, Chicago, Illinois

SUBJECT: Data Quality Review for Asbestos, Western Mineral Processing, Minneapolis, Hennepin County, Minnesota

REFERENCE: Project TDD S05-0006-010 Analytical TDD S05-0008-803
Project PAN 0N1001RSXX Analytical PAN 0GAC01TAXX

The data quality assurance (QA) review of 13 solid samples collected from the Western Mineral Processing site is complete. The samples were collected on August 1 and 2, 2000, by the Superfund Technical Assessment and Response Team (START) contractor, Ecology and Environment, Inc. (E & E). The samples were submitted to Reservoirs Environmental Services, Inc., Denver, Colorado. The laboratory analyses were performed according to the United States Environmental Protection Agency (U.S. EPA) Method 600/R-93/116 for analysis using polarized light microscopy (PLM) and by transmission electron microscopy (TEM).

Sample Identification

START Identification No.	Laboratory Identification No.
RES-7	EM 500440
RES-8	EM 500441
RES-9	EM 500442
RES-10	EM 500443
RES-11	EM 500444
RES-12	EM 500445
RES-13	EM 500446
RES-14	EM 500447
RES-14D	EM 500448
RES-15	EM 500449
RES-16	EM 500450
RES-8I	EM 500451
RES-12I	EM 500452

Data Qualifications:

I. Sample Holding Time: Acceptable

The samples were collected on August 1 and 2, 2000, and analyzed on August 18, 2000. The Office of Solid Waste and Emergency Response (OSWER) Directive 9360.4-01 (April 1990) does not specify holding times for these parameters.

II. Overall Assessment of Data for Use: Acceptable

The overall usefulness of the data is based on criteria for QA Level II as outlined in OSWER Data Validation Procedures, Section 9.0, Generic Data Validation Procedures. Based upon the information provided, the data are acceptable for use.

NVLAP LAB NO. 101896

ASBESTOS - TEM, PCM, PLM, SEM
METALS - AA, FLAME/FURNACE
AIRBORNE PARTICULATES
SPECIAL PARTICLE ANALYSIS

LAB I.D. 101533

RESERVOIRS ENVIRONMENTAL
SERVICES, INC.

1827 GRANT STREET DENVER, COLORADO 80203-1107 (800) 678-7374 (303) 830-1986 FAX (303) 863-9196

August 23, 2000

Mr. Dave Hendren
Ecology & Environment, Inc.
33 N. Dearborn Street
Suite 900
Chicago, IL 60602

RE: RES Job No. 71542-1&2- KJO5, S05-0008-803 – Bulk Samples: RES-7, RES-8, RES-9, RES-10, RES-11, RES-12, RES-13, RES-14, RES-14D, RES-15, RES-16, RES-8I, RES-12I.

Dear Mr. Hendren:

Reservoirs Environmental Services, Inc. (RES, Inc.) has analyzed 13 bulk material samples by Polarized Light Microscopy (PLM). Eleven samples were further characterized by Transmission Electron Microscopy (TEM) and Energy Dispersive X-ray Spectrometry (EDX) to confirm the type of asbestos mineral present. The samples were received on August 5, 2000.

PLM was used to analyze the bulk material samples in compliance with guidelines established by the USEPA (EPA/600/R-93/116). Amphibole asbestos was found in 9 of the 13 samples analyzed. Tremolite/actinolite was detected in each of the positive samples ranging from a trace to 95%. Chrysotile asbestos was also detected in RES-16. The PLM results are presented in Table I.

TEM/EDX was used to characterize the amphibole fibers in the samples. Samples RES-8I and RES-12I were not analyzed by TEM/EDX per your request. Electron microscopy results are summarized in Table II. Amphibole asbestos fibers were detected in all samples analyzed by TEM with the exception of sample RES-14D. Electron micrographs and x-ray spectra were collected from each sample that contained asbestos. An estimation of concentration was not made during the TEM analysis. The fibers varied slightly in elemental composition but were generally in the Tremolite – Actinolite solid solution series. Minor peaks of sodium and potassium were present in many of the fibers.

Sodium combined with a smaller Calcium peak is consistent with the mineral Ricterite found in the some vermiculite deposits. The appearance of the fibers in these samples was similar in all samples and consistent with amphibole fibers. Representative electron micrographs of the fibers are in Attachment I. Characteristic X-ray spectra are presented in Attachment II, Count Sheets are in Attachment III.

RES. Inc. has assigned job number RES 71542-1 to this study. This report is considered highly confidential and the sole property of Ecology & Environment, Inc. RES, Inc. will not discuss any part of this study with personnel other than those of the client. The results described in this report only apply to the samples analyzed. Samples will be disposed of after sixty days unless longer storage is requested. This report must not be used to claim endorsement of products or analytical results by NVLAP or any agency of the U.S. Endorsement. Only the PLM results contained in this report are subject to NVLAP accreditation, other information presented is not NVLAP accredited.

If you should have any questions about this report, Please feel free to call me at (303) 830-1986.

Sincerely,

Jeanne Spencer Orr
President

Paul D. LoScalzo

PLM Analyst, Paul D. LoScalzo

RESERVOIRS ENVIRONMENTAL SERVICES, INC.

NVLAP Accredited Laboratory #1896 TDH 30-0136

TABLE I. PLM BULK ANALYSIS, PERCENTAGE COMPOSITION BY VOLUME

RES Job Number: **RES 71542-1**
Client: **Ecology & Environment, Inc.**
Client Project: **KJ05, S05-0008-803**
Date Samples Received: **August 12, 2000**
Analysis Type: **PLM Short Report, Bulk**
Turnaround: **7-10 Day**

Client Sample Number	Lab ID Number	Layer	Physical Description	Portion of Total Sample (%)	ASBESTOS CONTENT BY LAYER Mineral	ASBESTOS CONTENT BY LAYER Visual Estimate (%)	Non-Asbestos Fibrous Components (%)	Non-Fibrous Components (%)
RES-7	EM 500440	A	Brown soil	100		ND	TR	100
RES-8	EM 500441	A	Brown soil	100	Trem-Act	2	TR	98
RES-9	EM 500442	A	Brown soil	100	Trem-Act	2	TR	98
RES-10	EM 500443	A	Brown soil	100	Trem-Act	TR	1	99
RES-11	EM 500444	A	Brown soil	100	Trem-Act	TR	3	97
RES-12	EM 500445	A	Brown soil	100	Trem-Act	7	TR	93
RES-13	EM 500446	A	Brown soil	100	Trem-Act	TR	1	99
RES-14	EM 500447	A	Brown soil	100		ND	1	99
RES-14D	EM 500448	A	Brown soil	100		ND	2	98
RES-15	EM 500449	A	Brown soil	100		ND	TR	100
RES-16	EM 500450	A	Brown soil	100	Chrysotile*	TR	TR	100
					Trem-Act	TR		
			*Chrysotile in ins. or wrap					

ND = None Detected
TR = Trace, < 1% Visual Estimate
Trem-Act = Tremolite-Actinolite
Point Count Trace = Observed but not countable under protocol, < 0.25%
Analyst: PDL
Data QA

RESERVOIRS ENVIRONMENTAL SERVICES, INC.

NVLAP Accredited Laboratory #1896 TDH 30-0136

TABLE I. PLM BULK ANALYSIS, PERCENTAGE COMPOSITION BY VOLUME

RES Job Number: **RES 71542-1**
Client: **Ecology & Environment, Inc.**
Client Project: **KJ05, S05-0008-803**
Date Samples Received: **August 12, 2000**
Analysis Type: **PLM Short Report, Bulk**
Turnaround: **7-10 Day**

Client Sample Number	Lab ID Number	Layer	Physical Description	Portion of Total Sample (%)	ASBESTOS CONTENT BY LAYER Mineral	Visual Estimate (%)	Non-Asbestos Fibrous Components (%)	Non-Fibrous Components (%)
RES-8I	EM 500451	A	Multicolored rock fragments	100	**Trem-Act**	80	0	20
RES-12I	EM 500452	A	Green rock fragments	100	**Trem-Act**	95	0	100

ND = None Detected
TR = Trace, < 1% Visual Estimate
Trem-Act = Tremolite-Actinolite
Point Count Trace = Observed but not countable under protocol, < 0.25%

Data QA

RESERVOIRS EMVIRONMENTAL SERVICES, INC.

NVLAP Accredited Laboratory #101896

TABLE II: Electron Microscopy Results Summary

RES Job Number: RES 71542-2
Client: Ecology & Environment, Inc.
Date Samples Received: 12-Aug-00
Analysis Type TEM/EDX Presense/Absense
Turnaround: 14 Days

Client Sample Number	Lab ID #	Tremolite/Actinolite Present?	Other Asbestos Present?	Comments
RES-7	500440	Yes		Very rare
RES-8	500441	Yes		
RES-9	500442	Yes		
RES-10	500443	Yes		
RES-11	500444	Yes		
RES-12	500445	Yes		
RES-13	500446	Yes		
RES-14	500447	Yes		Very rare
RES-14D	500448	No		
RES-15	500449	Yes	Chrysotile	Long, thin chrysotile fibers more abundant
				than the amphibole fibers which were rare
RES-16	500450	Yes		
RES-8I	500451	Not Analyzed		
RES-12I	500452	Not Analyzed		

ATTACHMENT I

Electron Micrographs

Figure 1: Electron micrograph of an amphibole fiber found in sample RES-7. Amphibole fibers were rare in this sample. Magnification 10,000X.

Figure 2: Electron Micrograph amphibole fibers in sample RES-8. Similar fibers found on RES-9 through RES-13. Magnification 5000X.

Figure 3: Electron micrograph of amphibole fibers found on RES-9. Magnification 5,000X.

Figure 4: Electron Micrograph a rare amphibole fiber found on RES14. Magnification 10,000X

Figure 5: Chrysotile fibers, an amphibole fiber and associated debris found on RES-16. Magnification 8,300X.

Figure 6: Amphibole fibers found on RES-16. Magnification 10,000X.

ATTACHMENT II

Energy Dispersive X-Ray Spectra

UALITATIVE ELEMENT IDENTIFICATION

F ID:EM 500440 TREM/ACT

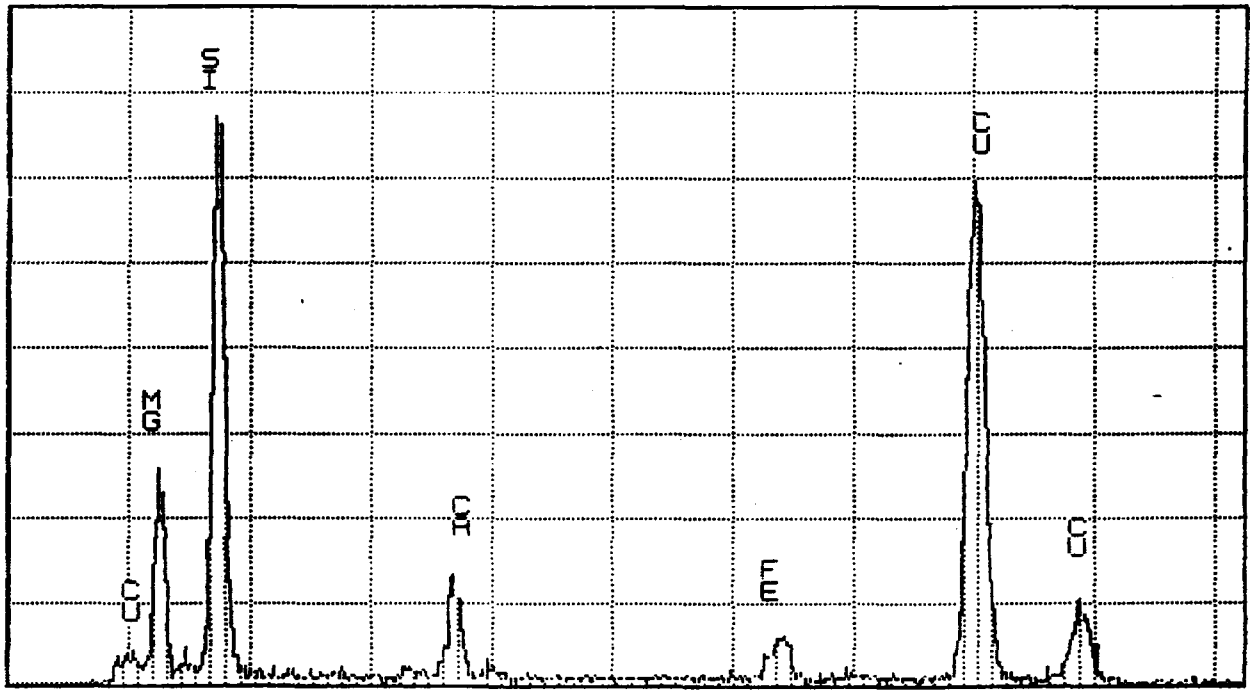
SSIBLE IDENTIFICATION
CU KA KB LA
SI KA OR RB LA?
MG KA OR AS LA?
CA KA
FE KA

PEAK LISTING

	ENERGY	AREA	EL. AND LINE
1	0.973	84	CU LA
2	1.254	997	MG KA OR AS LA?
3	1.741	2987	SI KA OR RB LA?
4	3.688	580	CA KA
5	6.391	261	FE KA
6	8.023	3093	CU KA
7	8.886	469	CU KB

TN-5502 RESERVOIRS ENVIRONMENTAL se FRI 18-AUG-00 17:09

Cursor: 0.000keV = 0



0 000 VFS = 512 10.240

40 EM 500440 TREM/ACT

QUALITATIVE ELEMENT IDENTIFICATION

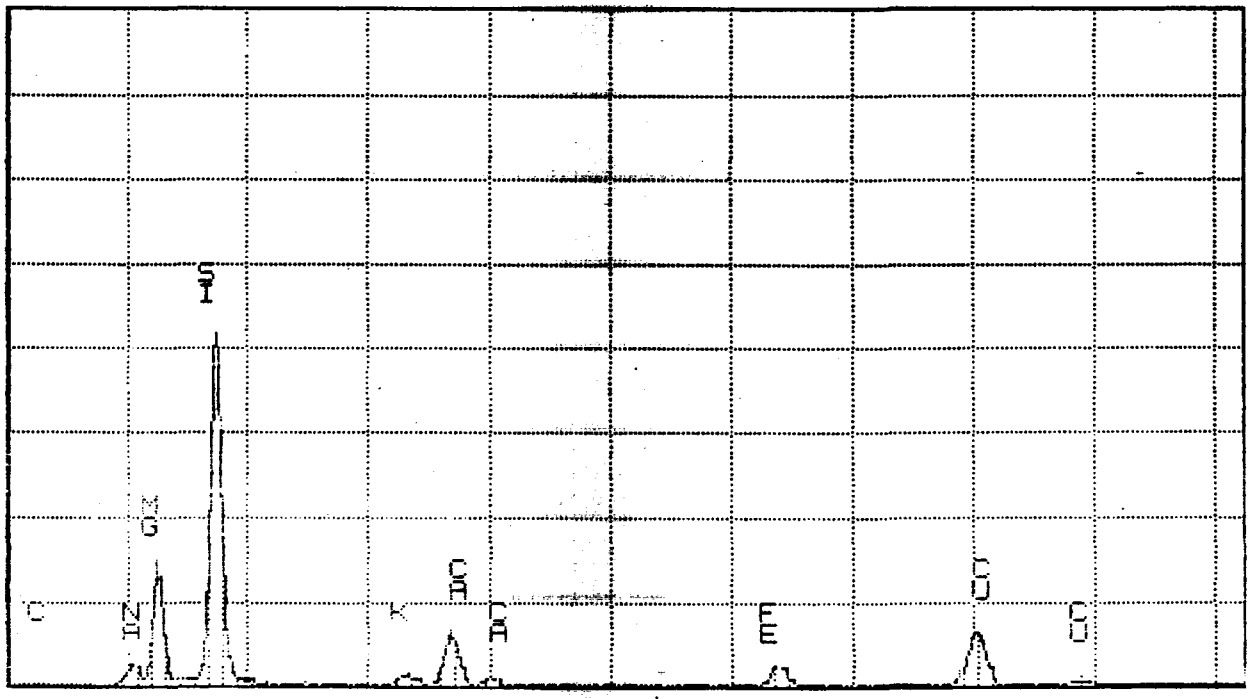
SAMPLE ID:EM 500441 TREM/ACT NA

POSSIBLE IDENTIFICATION
SI KA OR RB LA?
MG KA OR AS LA?
CU KA KB
CA KA KB
FE KA
K KA OR IN LA?
NA KA
C KA

PEAK LISTING

	ENERGY	AREA	EL. AND LINE
1	0.253	34	C KA
2	1.005	182	NA KA
3	1.254	2247	MG KA OR AS LA?
4	1.741	7207	SI KA OR RB LA?
5	3.314	204	K KA OR IN LA?
6	3.688	1200	CA KA
7	4.017	157	CA KB
8	6.388	493	FE KA
9	8.026	1273	CU KA
10	8.888	158	CU KB

TN-5502 RESERVOIRS ENVIRONMENTAL se FRI 18-AUG-00 17:29
Cursor: 0.000keV = 0



0.000 ES-99 VFS = 2048 10.240
50 EM 500441 TREM/ACT NA

QUALITATIVE ELEMENT IDENTIFICATION

'E ID:EM 500442 TREM/ACT NA

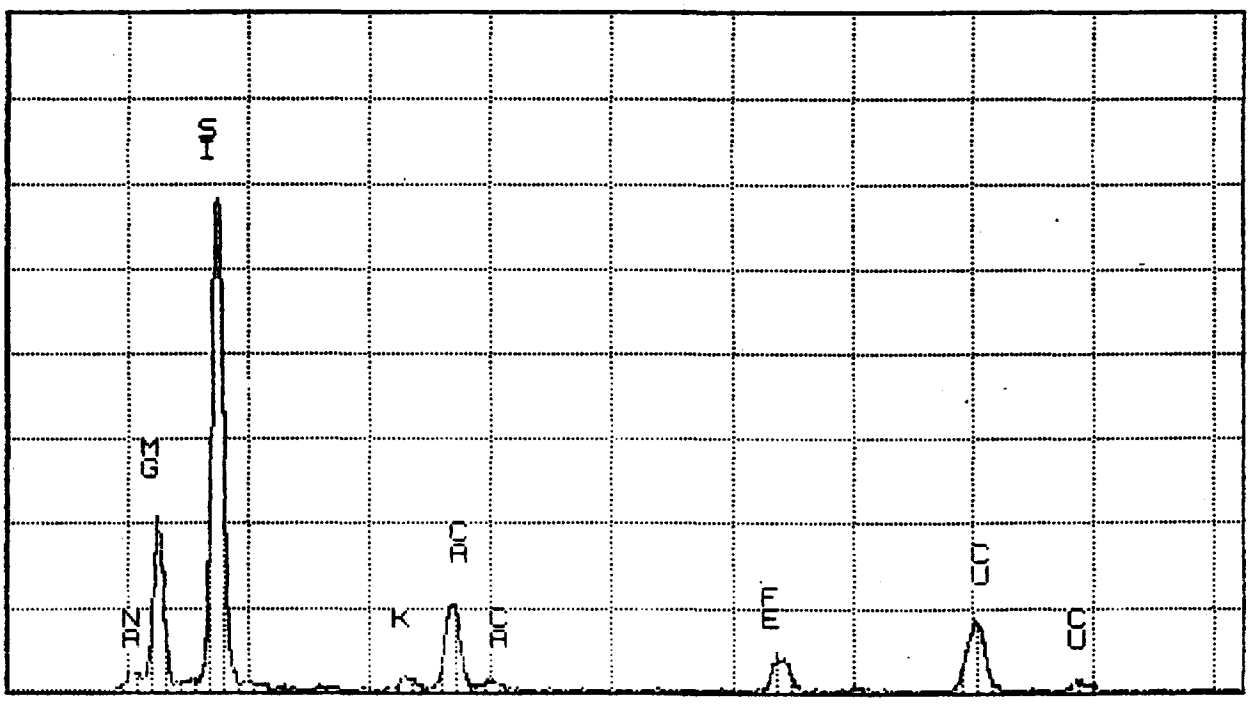
POSSIBLE IDENTIFICATION
SI KA OR RB LA?
MG KA OR AS LA?
CA KA KB
CU KA KB
FE KA
K KA OR IN LA?
NA KA

PEAK LISTING

	ENERGY	AREA	EL. AND LINE
1	0.997	87	NA KA
2	1.255	3256	MG KA OR AS LA?
3	1.741	10610	SI KA OR RB LA?
4	3.312	240	K KA OR IN LA?
5	3.688	2060	CA KA
6	4.010	203	CA KB
7	6.386	853	FE KA
8	8.025	1702	CU KA
9	8.888	248	CU KB

TN-5502 RESERVOIRS ENVIRONMENTAL se FRI 18-AUG-00 17:34

Cursor: 0.000keV = 0



0.000 ES-99 VFS = 2048 10.240

51 EM 500442 TREM/ACT NA

QUALITATIVE ELEMENT IDENTIFICATION

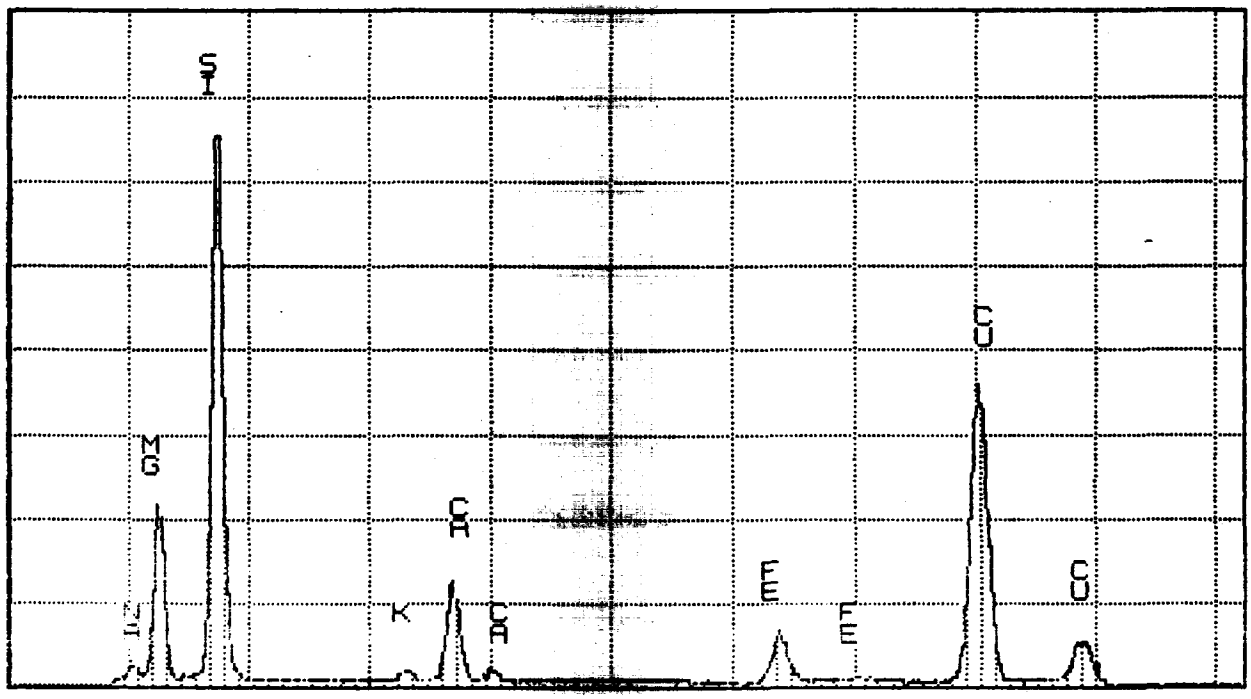
FILE ID:EM 500443 TREM/ACT

POSSIBLE IDENTIFICATION
SI KA OR RB LA?
CU KA KB
MG KA OR AS LA?
CA KA KB
FE KA KB
K KA OR IN LA?
NA KA

PEAK LISTING

	ENERGY	AREA	EL. AND LINE
1	0.993	290	NA KA
2	1.254	7121	MG KA OR AS LA?
3	1.740	23363	SI KA OR RB LA?
4	3.312	469	K KA OR IN LA?
5	3.688	4422	CA KA
6	4.015	575	CA KB
7	6.386	2299	FE KA
8	7.037	252	FE KB
9	8.023	14592	CU KA
10	8.882	2106	CU KB

TN-5502 RESERVOIRS ENVIRONMENTAL se FRI 18-AUG-00 18:34
Cursor: 0.000keV = 0



0.000 ES-99 VFS = 4096 10.240
55 EM 500443 TREM/ACT

QUALITATIVE ELEMENT IDENTIFICATION

SPECTRUM ID:EM 500444 TREM/ACT

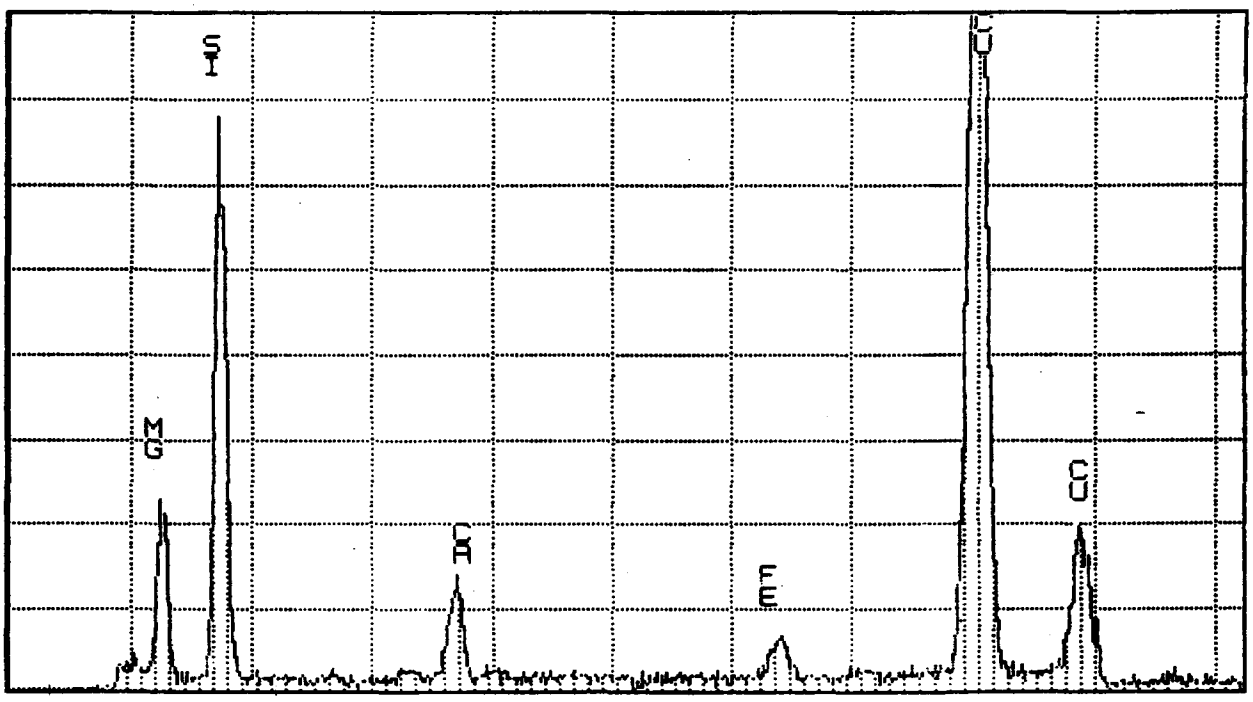
POSSIBLE IDENTIFICATION
CU KA KB
SI KA OR RB LA?
MG KA OR AS LA?
CA KA
FE KA

PEAK LISTING

	ENERGY	AREA	EL. AND LINE
1	1.255	904	MG KA OR AS LA?
2	1.739	2948	SI KA OR RB LA?
3	3.689	560	CA KA
4	6.396	245	FE KA
5	8.023	6138	CU KA
6	8.879	907	CU KB

TN-5502 RESERVOIRS ENVIRONMENTAL se FRI 18-AUG-00 18:46

Cursor: 0.000keV = 0



0.000 ES-99 VFS = 512 10.240

24 EM 500444 TREM/ACT

~ ITATIVE ELEMENT IDENTIFICATION

-MPLE ID:EM 500445

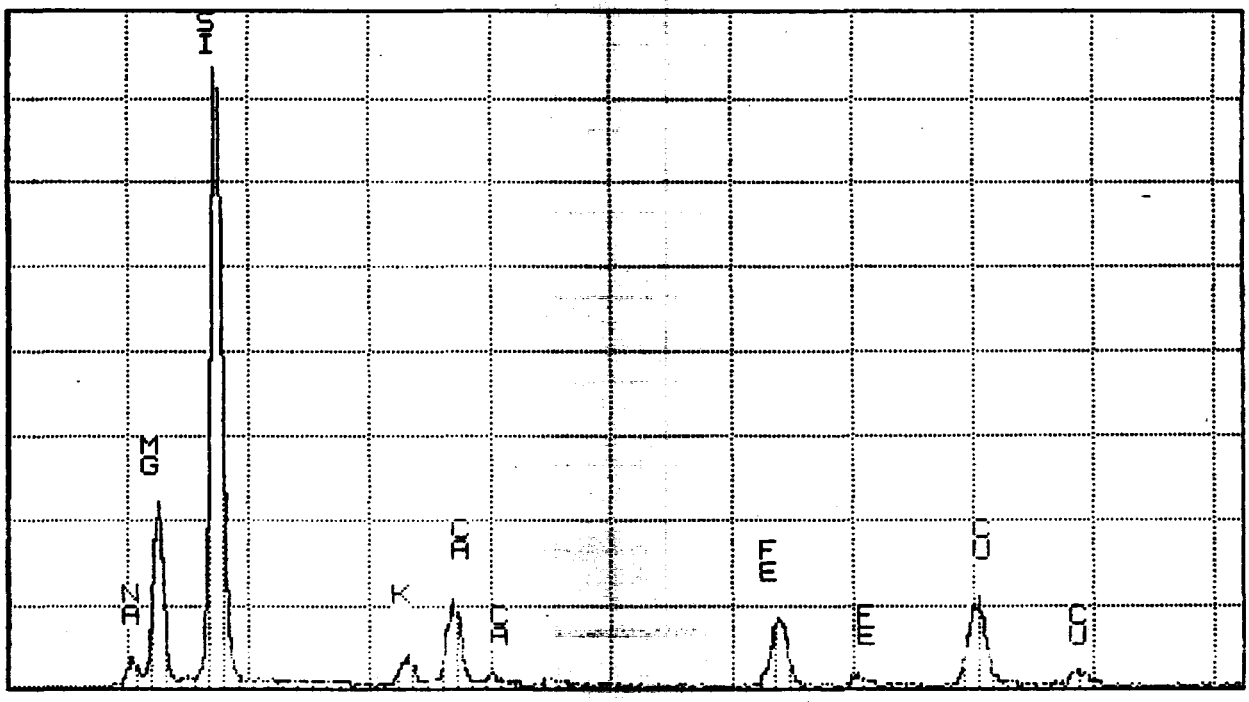
OSSIBLE IDENTIFICATION
SI KA OR RB LA?
MG KA OR AS LA?
CU KA KB
CA KA KB
FE KA KB
K KA OR IN LA?
NA KA

PEAK LISTING

	ENERGY	AREA	EL. AND LINE
1	1.005	214	NA KA
2	1.255	3442	MG KA OR AS LA?
3	1.740	13093	SI KA OR RB LA?
4	3.309	640	K KA OR IN LA?
5	3.687	1922	CA KA
6	4.020	194	CA KB
7	6.389	1658	FE KA
8	7.048	255	FE KB
9	8.019	2104	CU KA
10	8.877	342	CU KB

TN-5502 RESERVOIRS ENVIRONMENTAL se FRI 18-AUG-00 18:59

Cursor: 0.000keV = 0



0.000 ES-99 VFS = 2048 10.240

46 EM 500445

QUALITATIVE ELEMENT IDENTIFICATION

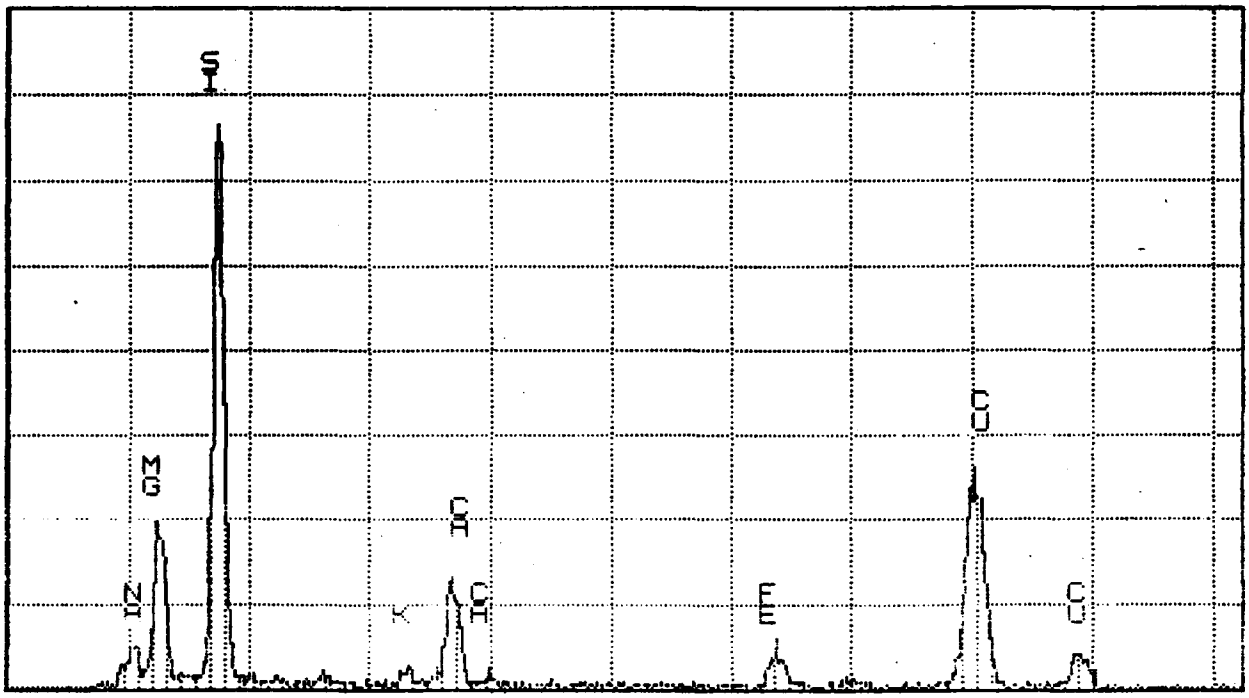
SAMPLE ID:EM 500446

POSSIBLE IDENTIFICATION
SI KA OR RB LA?
CU KA KB
MG KA OR AS LA?
CA KA KB
FE KA
NA KA
K KA OR IN LA?

PEAK LISTING

	ENERGY	AREA	EL. AND LINE
1	0.998	114	NA KA
2	1.256	808	MG KA OR AS LA?
3	1.740	2839	SI KA OR RB LA?
4	3.317	78	K KA OR IN LA?
5	3.686	605	CA KA
6	3.997	67	CA KB
7	6.377	209	FE KA
8	8.023	1287	CU KA
9	8.890	207	CU KB

TN-5502 RESERVOIRS ENVIRONMENTAL se FRI 18-AUG-00 19:17
Cursor: 0.000keV = 0



0.000 ES-99 VFS = 512 10.240
60 EM 500446

QUALITATIVE ELEMENT IDENTIFICATION

SAMPLE ID:EM 500446

QUALITATIVE ELEMENT IDENTIFICATION

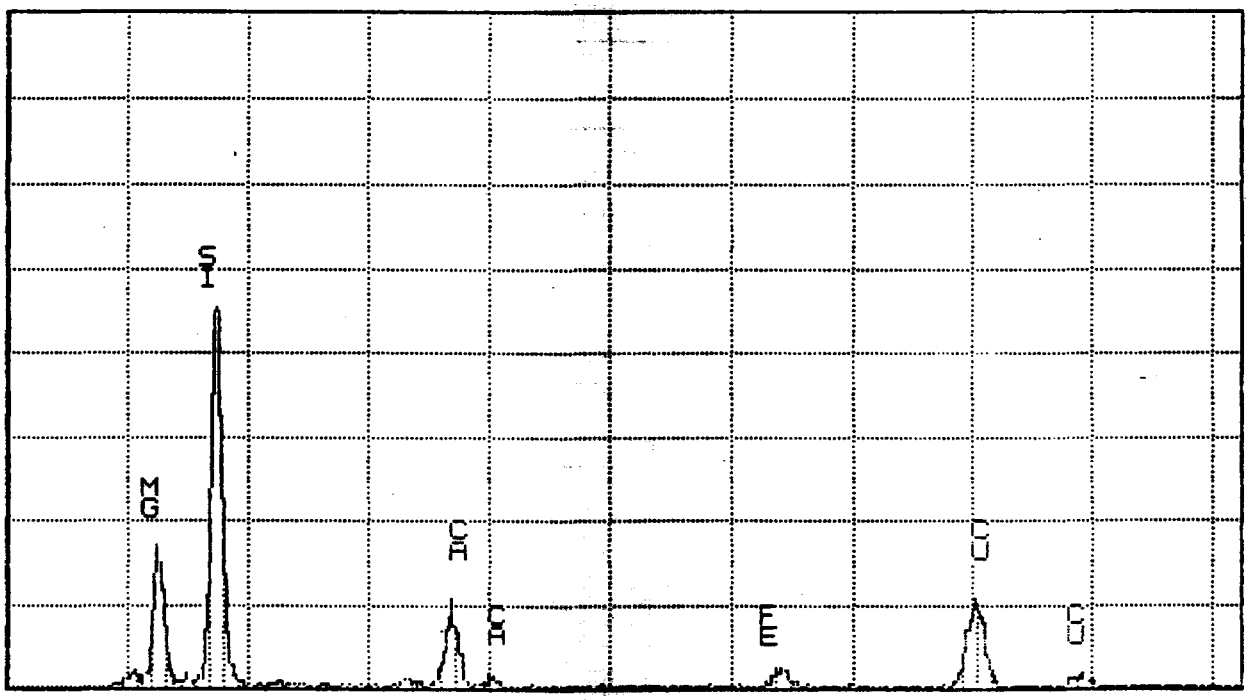
SAMPLE ID:EM 500447

POSSIBLE IDENTIFICATION
SI KA OR RB LA?
MG KA OR AS LA?
CU KA KB
CA KA KB
FE KA

PEAK LISTING

	ENERGY	AREA	EL. AND LINE
1	1.256	1342	MG KA OR AS LA?
2	1.739	3937	SI KA OR RB LA?
3	3.686	870	CA KA
4	4.024	98	CA KB
5	6.392	234	FE KA
6	8.025	1030	CU KA
7	8.894	152	CU KB

TN-5502 RESERVOIRS ENVIRONMENTAL se FRI 18-AUG-00 19:37
Cursor: 0.000keV = 0



0.000 ES-99 VFS = 1024 10.240
41 EM 500447

ITATIVE ELEMENT IDENTIFICATION

AMPLE ID:EM 500449 TREM/ACT W/NA, K

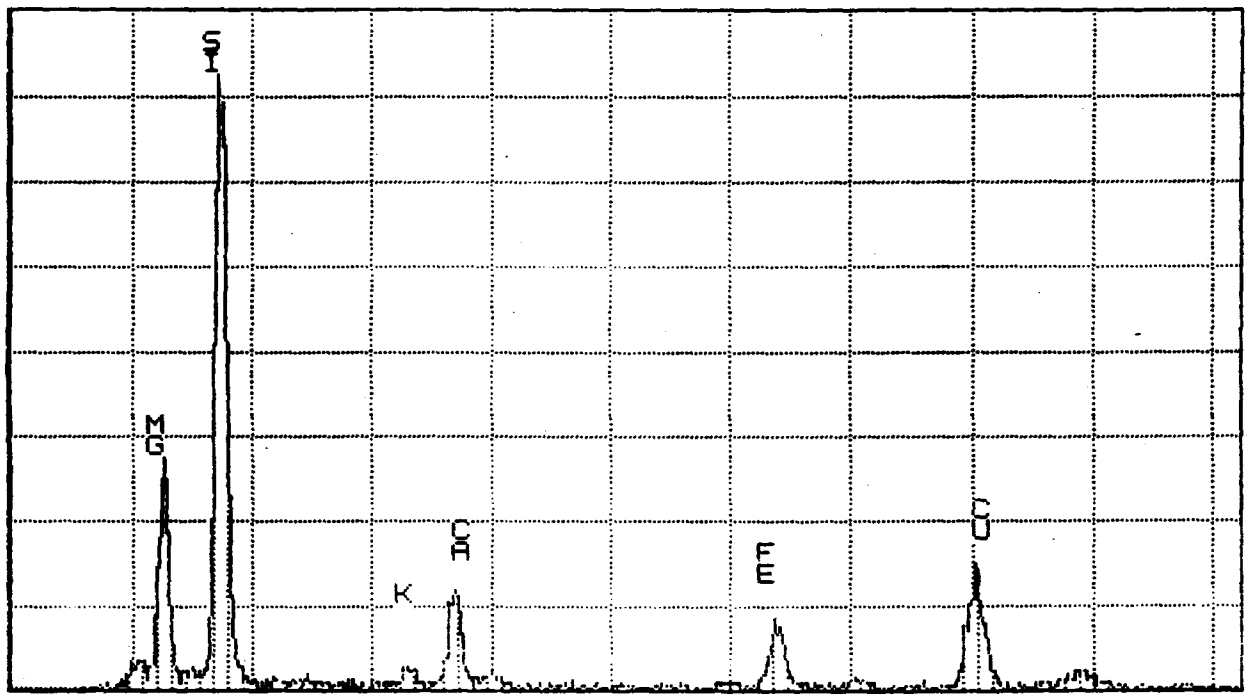
OSSIBLE IDENTIFICATION
SI KA OR RB LA?
MG KA OR AS LA?
CU KA
CA KA
FE KA
K KA OR IN LA?

PEAK LISTING

	ENERGY	AREA	EL. AND LINE
1	1.256	1024	MG KA OR AS LA?
2	1.740	3300	SI KA OR RB LA?
3	3.314	100	K KA OR IN LA?
4	3.690	543	CA KA
5	6.393	370	FE KA
6	8.023	656	CU KA

TN-5502 RESERVOIRS ENVIRONMENTAL se FRI 18-AUG-00 18:27

Cursor: 0.000keV = 0



0.000 ES-99 VFS = 512 10.240

55 EM 500449 TREM/ACT W/NA, K

ITATIVE ELEMENT IDENTIFICATION

SAMPLE ID:EM 500449 CHRYSOTILE

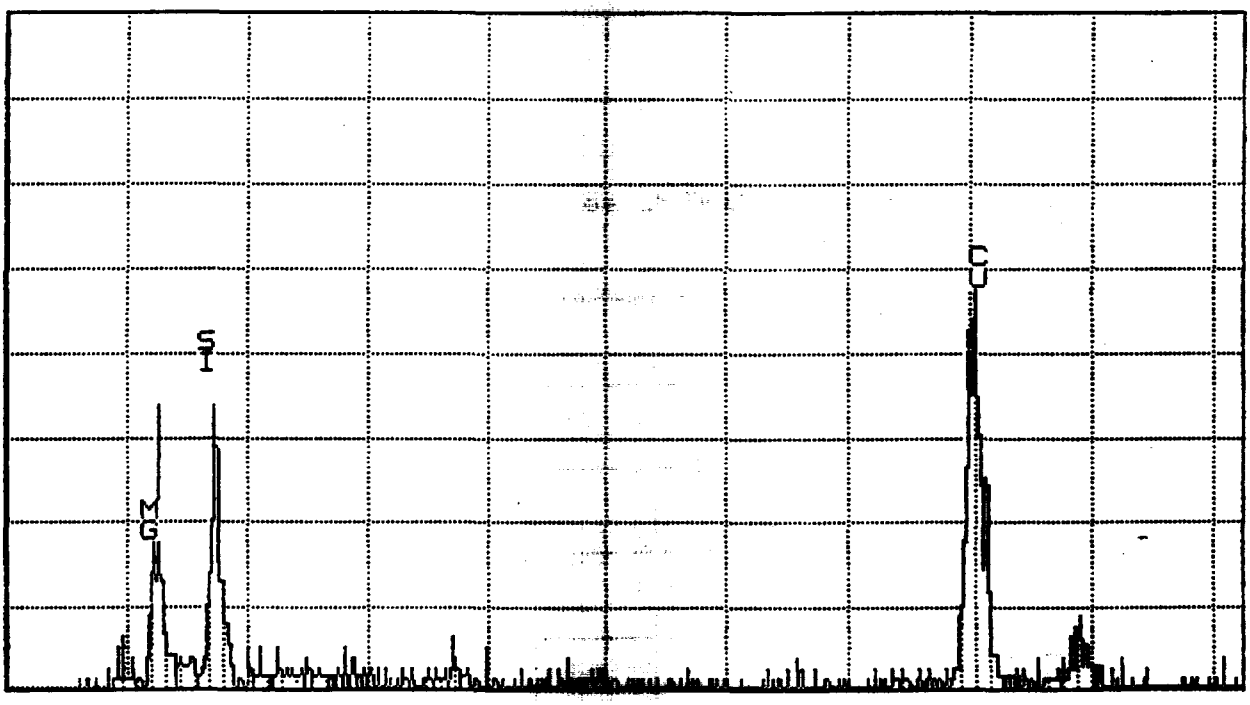
POSSIBLE IDENTIFICATION
CU KA
SI KA OR RB LA?
MG KA OR AS LA?

PEAK LISTING

	ENERGY	AREA	EL. AND LINE
1	1.254	111	MG KA OR AS LA?
2	1.737	147	SI KA OR RB LA?
3	8.030	277	CU KA

TN-5502 RESERVOIRS ENVIRONMENTAL se FRI 18-AUG-00 17:59

Cursor: 0.000keV = 0



0.000 ES-99 VFS = 64 10.240

63 EM 500449 CHRYSOTILE

ITATIVE ELEMENT IDENTIFICATION

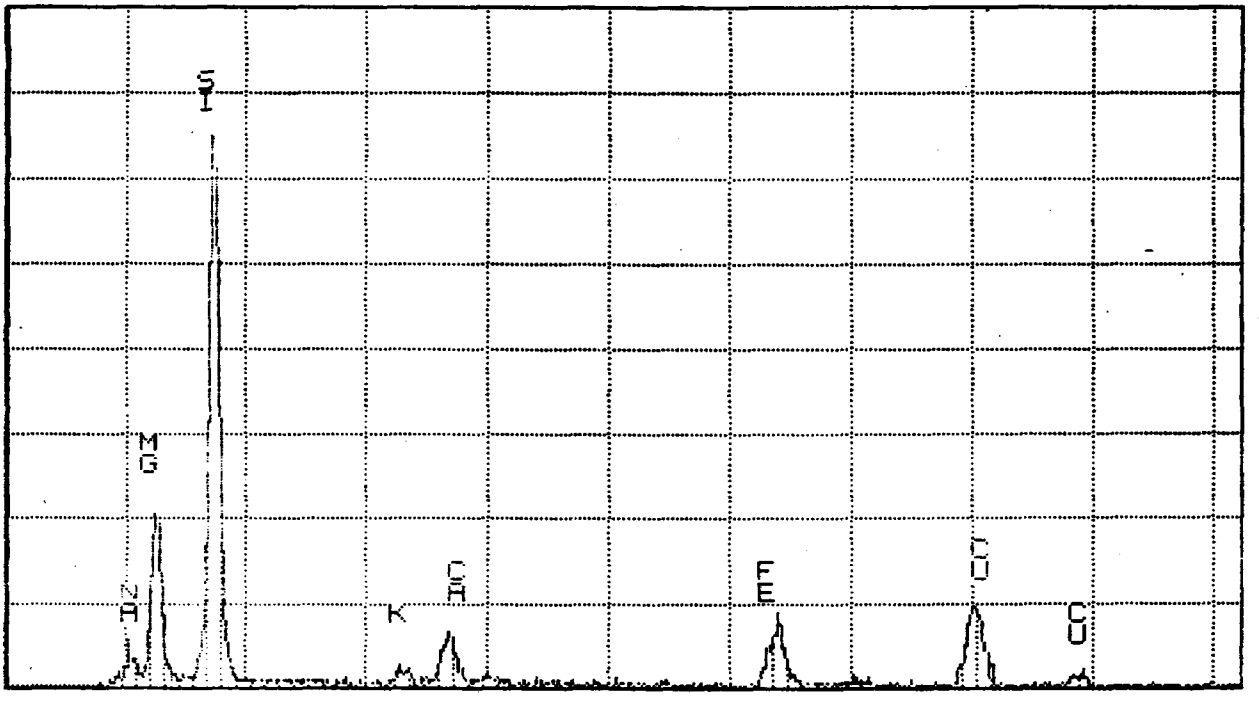
AMPLE ID:EM 500450

POSSIBLE IDENTIFICATION
SI KA OR RB LA?
MG KA OR AS LA?
CU KA KB
FE KA
CA KA
K KA OR IN LA?
NA KA

PEAK LISTING

	ENERGY	AREA	EL. AND LINE
1	1.003	73	NA KA
2	1.254	827	MG KA OR AS LA?
3	1.739	2801	SI KA OR RB LA?
4	3.304	77	K KA OR IN LA?
5	3.685	281	CA KA
6	6.393	364	FE KA
7	8.023	482	CU KA
8	8.890	80	CU KB

TN-5502 RESERVOIRS ENVIRONMENTAL se FRI 18-AUG-00 19:49
Cursor: 0.000keV = 0



0.000 EE-99 VFS = 512 10.240
50 E1 500450

FLEXTRAN [1]-A1

ENT-65/40

ATTACHEMENT III

Count Sheets

Job Number: RES 71542 Filter Type: MCE Operator: JRD

Client Sample No: RES-7 Filter Area: 385 mm^2 Mag/Volts: 20KX/100KV

Lab Sample No: 500440 Grid Opening Area: 0.01 mm^2 Date: 8/18/00

Instrument: JEOL100CX No. GO's Analyzed: +/- Page: 1 of 1

Grid Opening	Structure Type	Length	Width	Confirmation SAED	Confirmation EDX	Photo ID#	Comments
	AF	23	5	+	+	10328	10KX
Amphibole fibers very rare on this prep. Prep A 5-50% debris only. 2 fibers located in scan of ~20 GO's.							

Job Number: RES 7154.2 Filter Type: MCE Operator: JRD

Client Sample No: RE3-8 Filter Area: 385 mm² Mag/Volts: 20KX/100KV

Lab Sample No: 500441 Grid Opening Area: 0.01 mm² Date: 8/18/00

Instrument: JEOL100CX Number Analyzed: +/- Page: 1 of 1

Grid Opening	Structure Type	Length	Width	Identification SAED EDX	Photo ID#	Comments
	Abundant Amphibole fibers present identified as Tremolite/Actinolite with sodium and a minor potassium peaks noted in the most fibers.					
	Cluster				10329	5KX

Job Number: RES 71542
Filter Type: MCE
Operator: JCO

Client Sample No: RES9
Filter Area: — mm^2
Mag/Volts: 20KX/100KV

Lab Sample No: 500442
Grid Opening Area: 0.01 mm^2
Date: 8/18/00

Instrument: JEOL100CX
No. GO's Analyzed: +/-
Page: 1 of 1

Grid Opening	Structure Type	Length	Width	Confirmation SAED	Confirmation EDX	Photo ID#	Comments
	Very similar to					500441	
	fibers w/various diameters					10330	5KX

JCO

Job Number: RES 71542 Filter Type: MCE Operator: [signature]

Client Sample No: RES-10 Filter Area: — mm² Mag/Volts: 20KX/100KV

Lab Sample No: 500443 Grid Opening Area: 0.01 mm² Date: 8/18/00

Instrument: JEOL100CX No. GO's Analyzed: +/- Page: 1 of 1

Grid Opening	Structure Type	Length	Width	Confirmation SAED	Confirmation EDX	Photo ID#	Comments
	Very similar to 500441 + 500442						
						10333	10KX

Job Number: RES 71542 Filter Type: MCE Operator: [signature]

Client Sample No: RES-11 Filter Area: — mm^2 Mag/Volts: 20KX/100KV

Lab Sample No: 500444 Grid Opening Area: 0.01 mm^2 Date: 8/18/00

Instrument: JEOL100CX No.GO's Analyzed: ______ Page: ____ of ____

Grid Opening	Structure Type	Length	Width	Confirmation SAED	EDX	Photo ID#	Comments
						100335	10KX
	Similar	to	500441, 2, + 3				

[signature]

Job Number: RES 71542 Filter Type: PCE Operator: [illegible]

Client Sample No: RES12 Filter Area: — mm² Mag/Volts: 20KX/100KV

Lab Sample No: 500445 Grid Opening Area: 0.01 mm² Date: 8/18/00

Instrument: JEOL100CX No.GO's Analyzed: +/- Page: 1 of 1

Grid Opening	Structure Type	Length	Width	Confirmation SAED	Confirmation EDX	Photo ID#	Comments
						10335	10KX
	Similar	to		441, 2, 3 + 4			
	Some EDX	Spectra		have a	larger		
	potassium	peak					

[illegible]

Job Number: RES 71542 Filter Type: — Operator: [signature]

Client Sample No: RES-13 Filter Area: — mm² Mag/Volts: 20KX/100KV

Lab Sample No: 500446 Grid Opening Area: 0.01 mm² Date: 8/18/00

Instrument: JEOL100CX No.GO's Analyzed: +/– Page: 1 of 1

Grid Opening	Structure Type	Length	Width	Confirmation SAED	Confirmation EDX	Photo ID#	Comments
						10336	2.6KX
	Similar to 500441-45						

[signature]

Job Number: RES 71542 Filter Type: — Operator: [signature]

Client Sample No: RES-14 Filter Area: — mm^2 Mag/Volts: 20KX/100KV

Lab Sample No: 500447 Grid Opening Area: 0.01 mm^2 Date: 8/18/00

Instrument: JEOL100CX No.GO's Analyzed: +/- Page: 1 of 1

Grid Opening	Structure Type	Length	Width	Confirmation SAED	EDX	Photo ID#	Comments
						10337	13KX
	Trace Amphibole fibers						
	TRACE						

[signature]

Job Number: RES

Filter Type: —

Operator: [signature]

Client Sample No:

Filter Area: — mm²

Mag/Volts: 20KX/100KV

Lab Sample No: 500448

Grid Opening Area: 0.01 mm²

Date: 8/18/00

Instrument: JEOL100CX

No.GO's Analyzed: 4/-

Page: 1 of 1

Grid Opening	Structure Type	Length	Width	Confirmation SAED	Confirmation EDX	Photo ID#	Comments
		No asbestos detected on this sample					

[signature]

Job Number: RES Filter Type: MCE Operator: KO

Client Sample No: _____ Filter Area: — mm² Mag/Volts: 20KX/100KV

Lab Sample No: 500449 Grid Opening Area: 0.01 mm² Date: 8/18/00

Instrument: ↓EDX100CX No. GO's Analyzed: +/- Page: 1 of 1

Grid Opening	Structure Type	Length	Width	Confirmation SAED	Confirmation EDX	Photo ID#	Comments
E4-1	Chrysotile + Trem/Act					10332	
	Chrysotile + Trem/Act					10333	8.3KX
	frequent Chrysotile fibers - long +						
	very thin < 0.05µm diamete - Rare						
	Amphibole fibers present Trem/Act.						
	w/ Na + K.						

Job Number: RES

Filter Type: MCE

Operator: [signature]

Client Sample No:

Filter Area: 385 mm^2

Mag/Volts: 20KX/100KV

Lab Sample No: ~~500500~~ 500450

Grid Opening Area: 0.01 mm^2

Date: 8/18/00

Instrument: JEOL100CX

No.GO's Analyzed: +/-

Page: 1 of 1

Grid Opening	Structure Type	Length	Width	Confirmation SAED	Confirmation EDX	Photo ID#	Comments
	Amphibole asbestos fibers present						
	TR/ACT w K and Na						
						10338	8.3 KX

[signature]